THE
SURGICAL CLINICS
OF
CHICAGO

M. I. Piercy

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CONTENTS

CLINIC OF DR ALBERT E HALSTEAD

St Luke's Hospital

THE SURGICAL TREATMENT OF FACIAL PARALYSIS

Summary Indications for surgical treatment, spinal accessory—facial anastomosis development of the operation historic sketch technic in present case

Case History—Mrs H , aged forty-eight, housewife Four months ago was operated on for chronic mastoid infection During this operation the facial nerve was injured Immediately following there was complete unilateral (left) facial paralysis Since then there has been not the slightest improvement in the paralysis The mastoid wound has completely healed

The history of this case, except that relating to a chronic middle-ear disease ten years ago which was followed by increasing dizziness and vertigo with pain referred to the mastoid region, is negative It was for the relief of these symptoms that a radical mastoid operation was done

Physical examination reveals nothing abnormal except the scars resulting from healed varicose ulcers of both legs, also scars showing excision of superficial veins of both legs This operation was done in this clinic four years ago with resulting cure of the ulcers

There is also complete unilateral facial paralysis There is absolutely no reaction to electric stimulation of the muscles either direct or through the nerve trunk No improvement has followed the treatment which has been employed since the onset of the paralysis We are, therefore, led to assume that the nerve has been divided, and that there is no hope of recovery unless nerve impulse can be secured by grafting the peripheral trunk of

the facial distal to the point of division upon the central portion of a normal nerve trunk, which is of less physiologic importance and, therefore, may be sacrificed

We have in this case selected the spinal accessory nerve for anastomosis

Historic —In 1898 Dr Faure, of the Hospital Laennec, made the first attempt to restore the function of a paralyzed facial nerve by dividing a neighboring motor nerve and uniting its central trunk to the paralyzed peripheral portion of the facial His patient suffered from paralysis of the facial due to an injury to the nerve in its course through the temporal bone The paralysis had lasted for eighteen months The facial was divided near the stylomastoid foramen, and united to the divided central portion of that portion of the spinal accessory nerve that supplies the trapezius muscle

Although this operation was not followed by a brilliant result, yet through frequent reference to it in the literature it seemed to attract attention to a procedure which was later employed with success in a considerable number of cases

This cause also led to a series of experiments on lower animals by a number of different investigators, which has placed nerve transplantation and nerve anastomosis on a sound scientific basis   Among those who early took up this line of investigation we may mention Manasse, in Germany, and Barrago-Ciarella, in Italy   The latter was able to report three successful anastomoses of the facial to the accessories in dogs   In a fourth case the central end of the vagus was united with success to the peripheral portion of a divided facial

In 1900 Robert Kennedy, of Glasgow, divided the facial in a case of severe facial spasm, and immediately united the peripheral portion to the central end of a completely divided spinal accessory Complete restoration of function of both groups of muscles, temporarily paralyzed by the section followed

In 1902 Cushing united the cut facial to the central end of the divided spinal accessory in a patient whose facial nerve had been paralyzed from a gunshot wound involving the right mastoid process   In this case complete success was recorded   The

report made two hundred and eighty seven days after the operation describes the electric reactions as practically normal to faradic and galvanic stimulation when applied directly to the muscles and indirectly through the nerves Individual coordination movements were found to be under good control The eye could be kept almost completely closed, the lower facial muscles were active The volitional control was effected without associated shoulder movements or contraction of other facial muscles There was, however, some asymmetry remaining

The report of this successful case did much to establish the operation of facial anastomosis in this country In 1903 a successful anastomosis of the facial to the hypoglossal was done in this clinic The patient at the end of one year was examined The control of the facial muscles was complete There was only slight co-ordinate movements of the tongue The facial expression was good In this case the lesion of the facial nerve had been caused by a bullet wound of the temporal bone The bullet had entered the right external auditory meatus, traversed the external auditory canal, entered the tympanic cavity, passing downward and forward, and lodging close to the body of the third cervical vertebra

Surgical Procedure—In this operation we may adopt the method of anastomosis first proposed by Leviesant, employing the central end in its entirety of a motor nerve known to have a normal central connection or we may employ only a part of the severed nerve in making the union to the peripheral portion of the paralyzed nerve, as was done by Kennedy, who preserved a part of the nerve supply to the trapezius and sternomastoid It may be said that an attempt to unite only a part of the spinal accessory to the facial would undoubtedly lessen the chance of securing the success of the operation and increase the difficulty of dissociation of co-ordinate shoulder movements With certain conditions present it may appear to the operator that anastomosis of the hypoglossal with the facial is preferable to the union of the accessory with the facial In the hypoglossal we have a longer nerve trunk and one that under ordinary conditions may be more easily identified However, there is generally no difficulty

experienced in the exposure and identification of the spinal accessory

In this operation as in all operations on the peripheral nerves success depends largely on the care with which the tissues are handled causing a minimum amount of traumatism and consequently, a minimum quantity of scar tissue in the healing process

1 The field of operation should be dry

2 Excessive sponging or crushing of tissues should be scrupulously avoided.

3 The nerves should be isolated without handling them

4 The division of the nerve trunks should be made with sharp cutting instruments

5 The union of the divided ends should be accomplished by accurate approximation and by fixation with a minimum number of sutures These should be of the finest suture material preferably silk.

It goes without saying that the nearer the stylomastoid foramen the facial trunk is divided the less danger there is of tension on the nerve suture As the nerve lesion causing the paralysis is generally within the temporal bone division close to the point of exit from the mastoid is generally possible Chipping off the tip of the mastoid and reflecting this divided portion with the attached sternomastoid gives access to the nerve close to the stylomastoid foramen At this point just posterior and below the lobe of the ear the nerve emerging from the mastoid above the posterior belly of the digastric muscle may be easily identified Passing below the digastric and the posterior auricular posterior to the facial lying upon the internal jugular vein, is the spinal accessory Doubt as to the identity of this nerve is removed by slightly irritating the nerve whereby a movement of the shoulder is brought about The nerve should be divided close to the point of entrance into the sternomastoid the central end turned upward and united above the digastric to the facial trunk (Fig 74) The united nerves at the point of union should be enclosed in a thin covering of subcutaneous fat and areolar tissue The wound is cleansed by washing with decinor
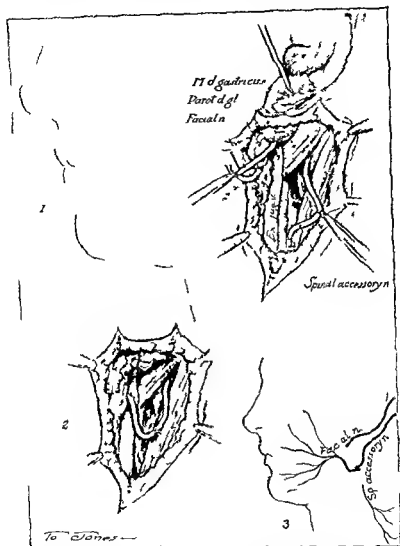
F g 74   Anastomos s of facial nerve w th spinal accessory

mal salt solution   The tip of the mastoid is replaced and held by
a catgut suture through the periosteum   The fascia closed by cat
gut sutures   and the skin by silk or silkworm gut

CLINIC OF DR ALBERT E HALSTEAD AND DR GEORGE F DICK

St Luke's Hospital

A CASE OF SYRINGOMYELIA WITH ARTHROPATHY

Summary The diagnosis of syringomyelia—importance of demonstration of characteristic sensory changes pathology of Charcot joints—most cases precipitated by trauma—diagnosis treatment of but little avail

THE patient whom I present to you this morning speaks no English, but we have obtained the history of his illness through an interpreter I shall read the history and demonstrate the important points in the physical examination quite in detail, because the case is typical of the conditions found in the majority of patients with syringomyelia who develop neuropathic joints and will therefore repay us for the close study which we purpose to give

HISTORY

Present Complaint—1 Swelling of right elbow

2 Loss of strength of right forearm and hand

The present complaint dated back ten weeks at which time the patient was struck on the right elbow with an iron gear while at work The elbow began to swell immediately, but the patient continued to work for the next three days during which time the elbow pained him but little On the third day his whole forearm began to swell down to and including his fingers This swelling persisted for two weeks, when it started to go down, first in the hand and later in the arm During the first four weeks of the period of acute swelling the arm was very painful and tender For the last six weeks it has remained about the same size, and is not tender to pressure or painful on movement The hand has remained cold and blue ever since the swelling went down and has

become practically useless because of the marked loss of power which has supervened in the muscles of the forearm and hand For several weeks there has been a cracking noise in the joint on movement

Past History —Denies venereal never sick

Habits --Bowels constipated appetite poor, sleeps fairly well, moderate drinker

Family History —Father and mother dead cause unknown Married, eight children, three dead five living No tuberculosis or cancer in family

PHYSICAL EXAMINATION

General —The patient is a slightly built Pole thirty nine years of age His general appearance is that of fair health

Fig 75   Fig 6

Figs 75 and 76   Neuropathic arthropathy of elbow in a case of syringomyelia

Head and Neck —The head and neck are negative There are no scars on the scalp The ears nose and throat are normal The pupils react to light and accommodation and are regular and equal. The teeth are in poor condition from neglect covered with tartar The skin of the head and neck are normal with respect to heat and cold touch and pain sensations

Chest —The heart and lungs are normal

Abdomen —The abdominal wall is the site of numerous atrophic scars from burning Some are fresh others are white with cicatricial tissue There are several similar scars on the back There is marked scoliosis to the right in the lumbar region

No tumor masses are present in the abdomen; there are no areas of tenderness.

Extremities.—The extremities are normal with the exception that there is evidence of an **injury**, with deformity of the right elbow. It is swollen two to three times its normal size and the
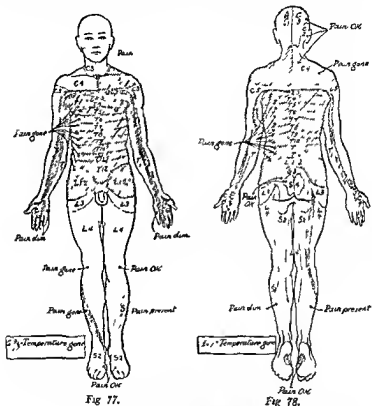
Figs. 77 and 78.—Diagrammatic representation of cutaneous sensory changes found in present case of syringomyelia

tumor mass fluctuates (Figs 75, 76) Crepitus is elicited upon manipulation, but there is no pain Patient is able to operate the arm, but is unable to flex it. There is slight atrophy of leg and arm muscles.

Lymphatics.—No adenopathy.

Nervous—The patient has a markedly spastic gait. The pupils react normally. The triceps tendon reflexes in both arms are exaggerated, as are also both patellar and Achilles' reflexes. There is a marked ankle clonus on both sides and typical Babinski reflex on both sides. Cremasteric and abdominal reflexes cannot be elicited.

Examination of cutaneous sensibility reveals a very interesting condition. If I take a sharp pin, a wisp of cotton and two test tubes, one filled with hot water and the other with cold and test the skin at various points with regard to the effect of these agents I find that I can map out definite areas in which the prick of the pin and the differences between the hot and cold tube cannot be distinguished, while the very delicate irritation of the wisp of cotton is readily perceived. These areas are for the most part, symmetric except the legs, and correspond precisely to the distribution of certain of the spinal nerves. This condition is graphically shown on these charts, which have been constructed to illustrate the dissociation of heat and cold and pain from touch sensation in this particular case. You will note the absence of the pain and temperature sense over the entire trunk and in certain limited regions which tend to be symmetric and correspond to the distribution of certain spinal nerves on the arms and legs (Figs. 77, 78)

Genitalia—Negative

LABORATORY REPORTS

Blood analysis. Wassermann negative

 Eryth. 4,750,000

 Leu., 7000

 Hb., 90 to 95 per cent.

Differential Lymphocytes—

 Small, 24 per cent.

 Large, 14 per cent.

 Indentate 4 per cent.

 Eosinophils 4 per cent.

 Large mono 2 per cent.

 Polymorph , 50 per cent.

Spinal fluid—

  Bloody

  Wassermann negative

Urine negative

x-Ray Report—Fracture of bones in elbow with callus formation   Exudate about joint   Charcot joint

The case is one of typical syringomyelia with Charcot joint

The cause of syringomyelia is unknown, although numerous possibilities are suggested   It is possible that inasmuch as the pathologic anatomy varies in different cases, a common cause will not be found

The disease has been found in individuals with congenital deformities such as spina bifida   It is more common in men than in women

The pathologic anatomy is that of a proliferation of glia cells about the central canal of the cord with degenerative changes and hemorrhage   Cavity formation occurs in these areas   The cervical cord is most commonly affected at the upper cervical cord and lower one-third of medulla   In the cervical cord the gray matter of the cord is uniformly encroached upon   In the lower dorsal and lumbar segments the posterior horns and posterior columns are oftener affected   The anterior lateral columns and anterior cornua may be affected or the posterior lateral columns and posterior cornua

Schlesinger distinguishes four clinical types of disease

  1 The classical type, beginning in the cervical region

  2 A motor type beginning similarly to amyotrophic lateral sclerosis

  3 Predominating sensory disturbances

  4 Pronounced trophic disturbances (Morvan's disease)

Dejerine adds (1) a bulbar, and (2) a tabetic type   According to Cramer, 20 to 80 per cent of syringomyelia cases show spinal curvatures, such as are present in this case   The curvature is not due to arthritis, but probably to weakness of the spinal muscles

The pathology of the joint affection in syringomyelia is identical with that of tabes dorsalis   In syringomyelia 80 per

cent. of the joints affected are found in the upper extremity The reverse of this is true in tabes, *i e*, about 80 per cent. of the joints involved being of the lower extremity In syringomyelia the shoulder joint is most frequently diseased

In syringomyelia we find as in tabes hypertrophy and hyperplasia of the peri articular tissues, effusions into the joint cavities, exostoses and hyperostoses of the articular ends of the bones.

The x ray shows, in these cases detached portions of bone from the articular surfaces of the joint, with great thickening of the peri-articular structures. We also find as in this case changes in the muscles about the joint, which are identical with myositis ossificans   In the case before you the x ray clearly shows bony deposits in the brachialis anticus and in the triceps muscles

We also find in this case a pathologic dislocation the bones of the forearm being dislocated backward. This is an uncommon finding in the *elbow*-joint in syringomyelia   In the shoulder it is common

The disease in this case, you will note from the history followed a trauma   This is usual in neuropathic joint lesions In the beginning the joint is usually painful   Pain begins as a rule as the apparent result of some injury   so that the joint affection is commonly regarded for at least a time as traumatic. If the course of the disease is watched it will be noted that the pain gradually subsides until we have before us as in this case, a joint showing extreme changes without any or perhaps but little pain   This is characteristic of neuropathic joints both in tabes and in syringomyelia.

TREATMENT

There is no known remedy for the underlying disease of the cord which is responsible for the joint condition

Local treatment of the joint lesion is unsatisfactory   Puncture with evacuation of the effusion gives temporary relief but seldom gives a useful joint.   Incision and drainage offer some hope of benefit.   In a few cases the wound heals before the joint tissue becomes retracted, and improvement is brought about   In other cases

healing of the incision is delayed   The wound suppurates and the
condition may be made worse than it was before the operation
In this case we will puncture the joint with a large trocar and
evacuate the fluid from the joint cavity

Operation.—The elbow and arm were painted with one-half
strength iodin and washed with alcohol   A large aspirating needle
was then introduced and a bloody fluid aspirated   The wound
was closed with collodion dressing

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BONE TRANSPLANTATION FOR REPAIR OF DEFECTS OF THE MANDIBLE

S hh av Reconstruction of the anter or portion of the mandible in a case operated on six months prev ously for central fibroma techn c behavior of bone transplants n infected fields upper end of tibia the ideal source of transplants for repair of defects of the lower jaw involving more than the body of the bone

December 22 1917

THIS patient (Figs 79 80) was operated on September 15 1916 for a central fibroma of the mandible The entire anterior portion of the mandible except the alveolar process and a con siderable portion of the left side of the ramus were removed (THE SURGICAL CLINICS OF CHICAGO February 1917) At the time of operation the mucous membrane of the mouth was opened exposing the wound to infection For this reason a transplant for the repair of the defect was not introduced im mediately The wound subsequently became infected and dis charged for four or five weeks but healed without the escape of any necrotic bone and without the loss of any of the front teeth the roots of which were all but exposed by the removal of the tumor Six months after the wound had healed the patient came back for repair of the marked deformity resulting from the loss of substance in the mandible (Fig 81)

Examination failed to reveal any evidence of recurrence of the tumor The operation was performed by exposing the area through the original incision which was considerably scarred as a result of the infection The bone was exposed and its surface was found to be rounded off by newly formed bone without any evidence of recurrence of the tumor This bony surface was fresh ened where it was to come in contact with the transplant

In searching for a location from which a horse-hoe-shaped transplant could be obtained for the repair of this defect the anteromesal aspect of the upper end of the tibia seemed to be the most favorable, as it affords a broad flat surface from which such a transplant can be cut   A flexible probe was molded into the shape of the defect which was horse-hoe shaped and about

Fig 79—Central abroma of jaw

½ inch longer on the right side than on the left   Consequently the rami of the transplant were cut slightly oblique from the upper tibial surface in order that the left one might extend backward on the tuberosity of the tibia and so be made longer than the right (Fig 82, 4)   A U shaped mass of bone was thus removed by means of the motor saw, the thickness of the ends being increased by cutting beyond the margins of the surface both posteriorly and anteriorly (Fig 82 5 6)   The central portion was cut away

with the motor saw after removing the **U** shaped mass, while the bone was firmly held by means of the bone holding forceps The transplant was fitted into the defect after trimming away the prominent portions of the endosteal surface (Fig 82, 7, 8), and

Fig 80 — Central fibroma of mandible Note the shadows suggestive of bony trabeculæ dividing the interior of the tumor into numerous cavities

was firmly held in position by the soft parts which were placed under considerable tension as a result of its introduction Two or three catgut sutures were passed anchoring the transplant to the soft parts of the mandibular region The wound was closed without drainage As nearly as I could tell the mucous membrane

of the mouth was not opened but unfortunately, infection oc
curred again A stitch was removed on the right side and pus
escaped after which a drain was introduced

The wound discharged quite profusely for some time and
necrotic bone could be felt by means of a probe Removal of
the infected transplant was considered, but knowing from my
experimental work on animals that infection of the transplant may

Fig 81 —Roentcenogram of jaw after operat on how ng the extent f the b n
defect

occur without killing all of its osteogenetic elements I decid l to
wait and see if some of it would not live and if the p rti n which
died would not become separated as a sequestrum After the
acute infection was over the wound continued to dischir e and in
the course of the five months which have followed the oper ti n
has opened and clo ed a number of times but without escape f
the necrotic bone During all of th s time a probe introduced

LEFT TIBIA

Anterior view

Medial view

Posterior view

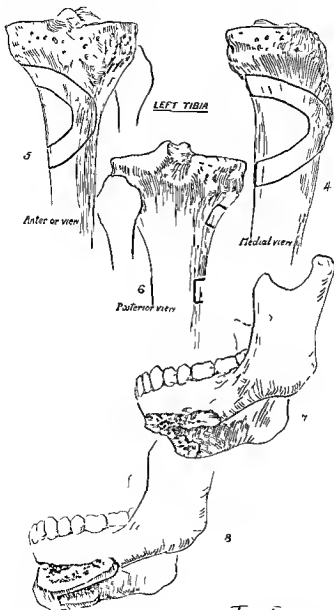Fig 82—4-8 Transplant outlined on tibia removed and fitted into defect in jaw

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The wound discharged quite profusely for some time and necrotic bone could be felt by means of a probe Removal of the infected transplant was considered, but knowing from my experimental work on animals that infection of the transplant may

Fig. 81—Roentgenogram of jaw after operation showing the extent of the bone defect

occur without killing all of its osteogenetic element I decided to wait and see if some of it would not live and if the portion which died would not become separated as a sequestrum After the acute infection was over the wound continued to discharge and in the course of the five months which have followed the perition has opened and closed a number of times but with little escape of the necrotic bone During all of this time a probe introduced

(Fig 84) Of course the result would have been better had infection not resulted, but its presence has brought out a very interesting fact with which we frequently have to deal in connection with bone transplantation

A study of transplanted bone shows that in the absence of infection the ossifying osteogenetic elements of the transplant

Fig 84 —Result after complete wound healing

located along the periosteal and endosteal surfaces and in the porous spaces and vascular canals of the bone substance survive, while the cells of the compact bone located in lacunæ and connected with the exterior by very small canaliculi receive insufficient nutrition and undergo necrosis   The subsequent changes

into the fistula revealed the presence of dead bone x Ray examinations made at intervals of about six weeks have shown very interesting changes going on in the transplant (Fig 83 six weeks after operation) Practically all of the compacta of the transplant underwent necrosis but the unossified osteogenetic elements along the surface of the anterior portion which did not become necrotic have formed considerable new bone similar to

Fig 83—Roentgenogram of region of defect six weeks after insertion of tibial transplant

the new bone formation which appears as an involucrum about dead bone in osteomyelitis This involucrum became attached in position as the sequestrum loosened up so that at the end of five months the latter was removed in fragments through the slightly enlarged fistulous opening Since removal of the portion of the transplant which became necrotic the wound has healed and you see that a very satisfactory chin has been formed

LEFT TIBIA

Medial view — *12*
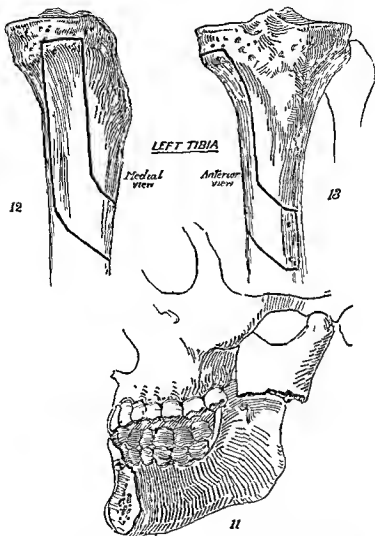
Anterior view — *13*

11

Fig 85—11—13 Outline of scheme for the utilization of bone from the upper end of the tibia in the repair of extensive defects of the mandible

the other, a long ramus can be obtained by cutting it obliquely, and the long arm should always be placed above, as the expanded

in the transplant are somewhat as follows The surviving osteogenetic elements proliferate and form new bone which unites the transplant in its position and gradually replaces the aseptic necrotic bone of the compact substance as it is slowly absorbed This process is known as "creeping substitution" of necrotic bone by new bone

When infection develops about a transplant the subsequent changes which go on in it are very much altered, depending to a considerable extent upon the severity of the inflammatory reaction If it is severe the entire transplant, including all of the osteogenetic elements which ordinarily survive in an aseptic field may undergo necrosis so that the transplantation is a complete failure If the infection is mild only a portion of the transplant may become separated as a sequestrum, and the osteogenetic elements of the remaining parts may survive and proliferate forming an involucrum about the remaining cortex such as occurs in osteomyelitis In this event transplantation is not a complete failure as the portion which separates as a sequestrum may be discharged and the resulting involucrum may fill out the defect in a fairly satisfactory manner as illustrated in this case Consequently we cannot say that infection in bone transplantation necessarily spells disaster and should not be in too great a hurry to remove the transplant as it may serve its purpose despite the infection and loss of a portion of its substance Had I not known of this occurrence the transplant would probably have been removed at the end of a week or ten days when it looked very much as if the operation were a failure

Since the performance of this operation I have experimented on cadavers as to the possibility of obtaining curved transplants from the upper end of the tibia for the repair of defects of the jaw of various shapes and sizes and have found it to be the most satisfactory region from which to obtain such material The transplant can be so cut as to fill in a defect of almost any portion of the body and a considerable portion of the ramus of the jaw Where the anterior portion of the mandible has been destroyed either in part or in toto a transplant can be cut transversely from this surface but where the defect is greater on one side than on

LEFT TIBIA

16   *Medial view*

Posterior view   17

18

Fig. 87.—16-18. Outline of scheme for the utilization of bone from the upper end of the tibia in the repair of extensive defects of the mandible

Fig. 34.—34 35 Outline a scheme for the utilization of bone from the upper end of the tibia in the repair of extensive defects of the mandible.
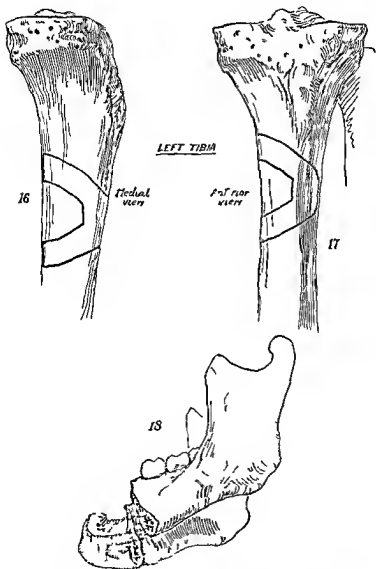
LEFT TIBIA

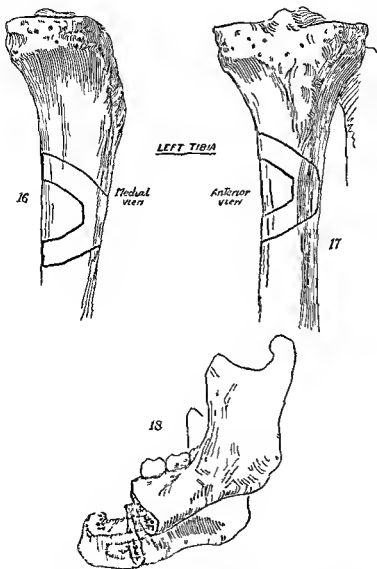16 *Medial view*

Anterior view 17

18

Fig 8".—16-18 Outline of scheme for the utilization of bone from the upper end of the tibia in the repair of extensive defects of the mandible.

condyles afford a greater surface from which it can be obtained
If the long side of the transplant is to be placed on the left side
the right tibia should be used but if on the right side the left one
as the periosteal surface should be placed downward in either case
The cuts into the bone should be carried deeply in order to give
as much depth as possible to the newly formed ramus The
portion which comes from the tuberosity should include the
trabeculated bone to a considerable depth Where half of the
body and a portion of the ramus of the jaw have been destroyed
or removed as is frequently the case in excision for sarcoma or
carcinoma the defect can be repaired by a transplant the body
of which is cut longitudinally from the postero mesial portion
of the upper end of the tibia and the anterior curvature obtained
by extending it well up on to the expanded condyle to within
1 cm of the end of the bone The portion of the ramus can be
obtained by extending the lower end transversely across the bone
to the tibial crest (Figs 85 86) Such a transplant is fitted
into the defect with the periosteal surface inward It can be
easily cut with the motor saw In order to prevent splitting the
transplant by attempting to make them after it has been taken
out, one or two holes for fixation should be bored at either end
before removal of the transplant from its bed Where the body
of the mandible alone is to be repaired a very satisfactory trans
plant can be obtained from the posterior portion of the seventh
or eighth rib taking advantage of the normal curvature in this
region but a single transplant which will fill out a defect of the
body and a portion of the ramus of the mandible cannot be
obtained from the rib Figure 87 illustrates the repair of a
complete defect of the anterior portion of the jaw

CLINIC OF DR ROGER T VAUGHAN

COOK COUNTY HOSPITAL

ACUTE OSTEOMYELITIS OF THE STERNUM· WOODY PRESTERNAL PHLEGMON: OSTEOTOMY AND DRAINAGE

bones—incidence and clinical picture operative management in present case—incision and light gauze packing no sutures complications of osteomyelitis of sternum—progressive necrosis of costal cartilage mediastinal invasion pyemia

THE patient is an Austrian Pole who has been working as a molder in an iron foundry He is twenty six years of age and married He entered the hospital on June 23, 1917, at 11 A M, on the service of Dr Joseph L Miller The patient speaks no English and his history had to be obtained through an interpreter, not without considerable difficulty

Six days ago June 17th, the patient first noticed pain in the front of his chest It came on gradually, without chill It was referred to the region of the upper sternum and has been constant, dull and throbbing in character, and has been growing steadily worse since the onset The day before yesterday, June 21st, the patient first noticed some swelling in the region of his upper sternum This swelling has been gradually increasing since then The pain, too has become more intense since the swelling appeared The patient gives no history of an injury except that in his work he sometimes pushes heavy objects with his hands and chest He was not aware of any other illness immediately preceding the present attack He has had no previous or similar

attacks which confined him to bed. He denies venereal infection Neisserian or luetic. He has been married five years. His wife and three children are living and well. No children dead and no miscarriages

Examination shows a muscular and robust young white male Over the upper and middle portion of his sternum there is an almost symmetric swelling (Fig 88). It is elevated 1 or 1½ cm
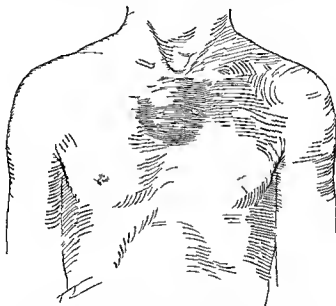

Fig 88—Location and extent of woody phlegmon overlying osteomyelitic focus The swelling is very hard red and tender

above the level of the chest is tender slightly reddened not at all

the swelling is a point of exquisite tenderness though the entire swelling is somewhat tender. Percussion gives a slightly dull note. The heart tones are heard through the swelling without difficulty

Examination of the heart and lungs is negative   No increase in mediastinal dulness, no enlargement of the veins of the chest or neck, no edema of either extremity or of the face, no bruits over the aorta, in the sternal notch, or along the carotids   The temperature in both hands is alike, no difference in pulses   Pupils equal and react to light   Voice not hoarse, no tracheal tug, no enlarged cervical, supraclavicular, or axillary glands

Abdominal examination is negative   No enlargement of the liver, no increase in tympany, no rigidity or dulness in the flanks, no edema of the legs or scrotum   Physical examination is otherwise negative

Temperature on entrance to hospital 101 4° F rectally, pulse 86, respirations 20   The nurse records that the patient complains of headache and does not seem very acutely ill

Urine examination is negative   It is clear, specific gravity 1020, acid reaction, no albumin or sugar or cellular elements   White count made the same afternoon shows 17,600 leukocytes to the cubic millimeter

A diagnosis of acute osteomyelitis of the sternum was made by the medical service, and this diagnosis was concurred in by Drs W W Hamburger and R T Vaughan, who were called to see the case   The man was accordingly transferred to the surgical service for immediate operation

COMMENTS

This case is interesting from both a pathologic and a diagnostic standpoint   Acute osteomyelitis of the flat bones, while unusual, is not so rare that one should be surprised at seeing a case   For instance, I have had 2 cases of acute osteomyelitis of the ilium on my County Hospital service at the same time   Of course the sternum is less frequently involved than the ilium, but the symptoms of osteomyelitis are usually so clear cut that one should recognize them with comparative ease wherever found

In making a diagnosis of acute osteomyelitis the *history* is very important   From this patient we can obtain no satisfactory history   He speaks no English whatever   Through the Polish interpreter we tried to get a statement as to antecedent

acute focal infection such as coryza bronchitis furuncle or the like, but while the two Poles held an animated and vociferous conversation for some time as we waited no definite data were elicited

The onset of the acute osteomyelitis in this case seems to have been fairly typical There was no preliminary chill, but chill is often absent in osteomyelitis of the flat bones particularly where only a portion of the bone is involved so-called focal osteomyelitis The marrow of flat bones is less vascular than that of the long bones and consequently there is less septic absorption. The suggestive joint symptoms usually found in osteomyelitis of the long bones are not present in acute osteomyelitis of a rigid flat bone like the sternum but pain gradually growing in severity dull and throbbing in character and finally the appearance of a firm woody swelling over the middle of the sternum tender and slowly increasing in size and accompanied by high fever and high leukocyte count present a picture which can scarcely be confused with any other acute lesion in this location.

The location of the swelling together with the throbbing character of the pain led one doctor to think of the possibility of a perforating aneurysm This possibility is easily ruled out. Although the patient feels a throbbing referred to the swelling there is no visible (or palpable) pulsation over the latter even with the aid of the paper test There is no bruit to be heard over the sternum nor elsewhere over the chest Perforating aneurysm in this location would have to come from the ascending arch of the aorta fairly close to the aortic valves An aortitis in this location of necessity is almost always associated with aortic regurgitation but there is none here As I said there are no bruits over the heart area nor is the heart enlarged the apex beat lying in the fifth interspace inside the nipple line There is no increased dulness over the upper sternum as with a dilated aorta and no pulsation in the episternal notch Furthermore if we were to diagnose a perforating aneurysm we should have to explain this man's fever and leukocytosis by assuming the existence of an accompanying inflammatory lesion There is no evidence of more than one lesion Of course we could have

a Wassermann test made, but it would take time This is an urgent case and unnecessary Wassermanns increase laboratory expense The diagnosis is quite certain without it, even though this were a man in the "aneurysm age," instead of being only twenty six years old

By "aneurysm age" I do not mean that a man of twenty-six cannot develop a syphilitic aneurysm but it is unusual I saw a patient only twenty eight years old only a few weeks ago with a small abdominal aneurysm which ruptured and caused death within less than an hour The patient came to the hospital as an acute abdominal emergency, and in coma, because so exsanguinated Through the relaxed abdominal walls one could feel the blood clots between the intestines besides making out the typical shifting dulness in the flanks The friends gave a history of abdominal tumor of short duration acute abdominal pain for a week, and sudden collapse on getting out of bed We were thus able to make a diagnosis of acute abdominal hemorrhage, and that, taken together with the history of long standing syphilis preceding development of the tumor, which was no longer to be felt when he entered the hospital, made the diagnosis easy At autopsy, however, we were surprised to find that it was a miliary aneurysm near the origin of the superior mesenteric artery which had burst so small that it could scarcely have caused a palpable tumor during life though it could account for his abdominal pain Whether the tumor said to have been felt by the patient was muscle rigidity a fecal mass, a dilated loop of small bowel or only this small aneurysm overlying the abdominal aorta, we cannot at present decide

To come back to the diagnosis of our present case, I might mention in passing the possibility of a fast growing round or spindle-celled sarcoma arising from the periosteum or fascia This might possibly be considered but it would have to be of extremely rapid growth and, therefore, very rare in this location It would hardly account for his high temperature and high leukocytosis Furthermore, there is no increase in the vascularity of the skin such as we see with sarcoma and then, too, the patient is below the usual sarcoma age

Mediastinal abscesses (they are usually tuberculous in origin) sometimes perforate the sternum But these are fluctuating tumors unless under great tension, are not very tender, and the accompanying infection is the slight afternoon temperature of tuberculous infection Puncture with an aspirating needle will make the diagnosis before incision even in those cases where fluctuation is absent

I am using the aspirating needle here in order to play "absolutely safe," since it can do no harm in any event. Have you ever cut down on an aneurysm expecting to find an abscess? I consider myself fortunate in never having done so, but I have seen it done Consequently, I use a small-caliber hypodermic needle in every abscess or tumor, which by any possibility might be a misdiagnosed aneurysm Dr Lee's fatal case of supposed supratonsillar abscess reported in the Murphy Clinic[1]

You see on suction I have secured nothing in this case except a trifle of slightly bloody serum I stuck my needle right through the swelling down to the bone The swelling is tense and hard and my needle went through it with marked resistance

OPERATION

Because of the tense character of the phlegmon I shall make my incision vertically and over the middle of the tumor I can thus secure the best exposure of the infected area Hear how my knife grates on this dense tissue I have cut down to the bone and no pus appears We have here only a dense, woody, not very vascular inflammatory tissue a so-called 'woody phlegmon," as I judge I am rather surprised to find it in this location, since we see these woody phlegmons generally in the neck. I consider this a sign of good omen, however Woody phlegmons usually mean that the infection is due to an organism of low virulence What we are particularly afraid of in sternal

organism is rather benign, our drainage, even though done rela

tively late, as here, that is, on the sixth day, may still save this boy's life. In general, the prognosis in osteomyelitis of the flat bones is, if anything, a little more serious, I should say, than in osteomyelitis of the long bones, because while the danger of pyemia is, perhaps, a little less, the flat bones are situated mostly so close to important viscera that visceral suppurative complications are high in frequency and degree of severity. Henschen states that the ordinary mortality in sternal osteomyelitis is 50 per cent., which, I should say, is not exaggerated.

I am now excising the periosteum vertically, and you will see that there is a little cloudy fluid under it, but not much. It separates very easily, you will notice, as in most cases of osteomyelitis. I am sponging off the subjacent bone to see if it "sweats" pus or cloudy serum. Only a few tiny droplets of blood appear. Evidently the pus is not thick or under great tension, as it so often is in the very vascular long bones of children. Now I have chipped away the cortex and we see that some of the marrow cavities show a distinctly cloudy, purulent fluid, though not the thick yellow pus we more frequently see. I am sending a culture of this organism to the laboratory, where I hope it will not get lost. I cannot tell what organism it is, but presume it is a coccus, because the absence of odor shows it is not an anaerobe. Perhaps it is a streptococcus of low virulence rather than a staphylococcus, because pus formation has not been so great as in the average Staphylococcus aureus case.

I am chipping away most of the cortical and medullary bone over the entire area lying directly below the woody phlegmon, clearing out the marrow back to the posterior cortex. Thus I hope to drain the seat of infection so completely that the anterior mediastinum will not become infected unless the infection has already taken place. If it should take place we can later easily drain it with a few blows of the chisel or bites of the rongeur through the posterior cortical layer of bone remaining provided we make the diagnosis in time. If his temperature keeps up or increases, *together with his leukocytosis*, if metastatic foci develop, if cyanosis and dilatation of the vessels of face, neck and

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the skin It causes death by perforation into the pericardium, the pleura, or a blood vessel

I have not performed the radical excision here of the entire sternum and costal cartilages which has been recommended for advanced cases where suppuration has embraced the whole bone (Korte) I believe this to be a relatively benign case The suppuration is local and there are no signs of mediastinal involvement at present I believe that the patient has a good chance to get well with simple anterior drainage

Have you ever had a case of progressive infectious necrosis of the costal cartilages following suppuration in their neighborhood? This is, fortunately, a rare lesion and one surgeon is not likely to have more than a single case, for which he has due reason to be thankful In spite of excision and more excision and then still more excision the necrosis goes right on, other cartilages become involved and slough, and death ensues under the picture of profound sepsis Of course, these are mostly patients of advanced years and less resistance than this young man, but the possibility of progressive costal cartilage necrosis is to be thought of and prophylaxis practised whenever one has a suppurating focus near the ribs in front, for instance in open rib fractures typhoid osteitis, osteomyelitis of the ribs, subphrenic abscess or a liver abscess draining between the ribs anteriorly This means supporting measures free drainage, and generous excision at the first appearance of necrosis

SUBSEQUENT COURSE

The patient ran a fever for several days after the operation Once it went to 104° F (rectal) six days after the operation, but no signs of metastatic foci developed and no mediastinal symptoms, so we continued to wait, and day by day the fever dropped and the patient's condition improved The skin edges were gradually drawn closer together by adhesive strips Two weeks after the operation his temperature and pulse had become practically normal His appetite picked up, the wound granulated nicely, and epidermization went on rapidly He was discharged from the hospital on July 19th, not quite four weeks after the

arms develop we shall then immediately send the patient up
to the x ray room and if an increased mediastinal shadow is
demonstrated we shall have all the indications necessary for at
once establishing mediastinal drainage as above outlined I am
cutting off a little section of this woody phlegmon for micro-
scopic examination

We now dress this wound wide open packing rather lightly
with iodoform gauze Our first obligation is to save this patient's
life second to get a good cosmetic result If he continues to
improve during the next few days it will be a simple matter to
draw the edges of the incision together again but we must have
complete and adequate drainage at the outset

I have not happened to see an acute osteomyelitis of the
sternum before I have seen several cases of osteomyelitis in
the other flat bones e g in the pelvis especially the ilium once
in the scapula and once in the spine Of course we all see osteo-
myelitis of the jaw the ribs and occasionally the skull

Drews reported a case of acute sternal osteomyelitis from
the surgical clinic in Rostock in 1910 and collected the literature
up to that time He said he was able to find only 13 cases which
would make this condition seem much rarer than it perhaps ac
tually is Sternal osteomyelitis constitutes nearly ⅓ of 1 per cent.
according to most statistics of all osteomyelitis lesions So it
must be more frequent than the number of reported cases col
lected by Drews would seem to indicate Our patient has had
only the body of the sternum involved This is the usual loca
tion the manubrium and gladiolus being less often involved
There are some cases reported of suppuration of the sterno-
clavicular joints on one or both sides Ruehnger tells of a case
of localized suppuration in the sternum confined to the synchon
drosis between the corpus and the manubrium As a rule these
cases perforate more readily posteriorly into the anterior medias
tinum than they do forward beneath the skin When a medias
tinal abscess forms it tends to spread laterally and may extend
as far on either side as the mammillary line even perforating
an intercostal space and appearing beneath or opening through

‡ Drews, Inaug Diss Parchim 1910

SPONTANEOUS RUPTURE OF VENTRAL HERNIA IN OLD SCAR WITH PROTRUSION OF SMALL BOWEL

Summary Presentation of patient and operation—closure of abdomen without drainage, remarks on spontaneous ruptures of the abdominal wall

HISTORY

THE patient, a German woman sixty one years old, entered Cook County Hospital July 17, 1916, with a loop of the small bowel, 12 or 15 inches in length, lying free on the skin of the abdomen The bowel had a few strips of gauze covering it which had been placed there by the family physician The patient's previous history is as follows

She was operated on at a private hospital in Chicago two years previously, that is, in 1914, for some abdominal condition The nature of this condition and the details of the operation performed she does not know

She made an uneventful recovery from this operation and had no subsequent trouble until today (July 17, 1916) About 4 o'clock in the afternoon while she was going about her house-work, she suddenly felt a sharp pain in her lower abdomen and then something warm and soft on the skin She loosened her clothes and saw the protruding bowel She was greatly alarmed and sent at once for her family doctor, who had her promptly transferred to the County Hospital The patient's abdominal pain has continued since the rupture occurred, and she complains that this pain runs all the way from the pubes to the lower sternum

Otherwise the patient has been perfectly well lately The only illness which she remembers before her operation two years ago was an attack of typhoid fever about thirty years previously She has had "grip" occasionally She has never been pregnant, and knows no reason why her abdominal wall should be so extremely weak unless it be due to the previous operation

operation   His wound was not quite completely epidermized,
but he felt so well that he said he must go back to work. His
temperature at that time had been almost normal for two weeks
once going as high as 100 2° F

So long as the patient's temperature still shows exacerba
tions, even though only moderate, it is possible that he may de-
velop some pyogenic complication   I dislike to have such a
patient leave the hospital, and he did so against my advice, but it
is very difficult to exert any adequate control over some of our
foreign population.

February 4, 1918   The patient, on request, returned for
re-examination   He states that he has felt well since leaving
the hospital and has been at work   A postero-anterior roentgen
ogram showed no particular change, the mediastinal shadow
was normal, and there was no very noticeable hyperostosis of
the sternum

say, $\frac{3}{4}$ or possibly $\frac{1}{2}$ inch in length, certainly no more, and barely admits a finger alongside the bowel The extruded bowel is dilated, dusky in color, but not black The tear is slightly diagonal from right above to left below, a little above the midpoint between the navel and the symphysis practically in the midline We are cleansing the bowel by swabbing it off with sponges wrung out of normal salt solution We shall not waste much time doing this however because there is no gross dirt on the bowel

Now the abdominal wall is prepared and I wrap the bowel in a moist sterile towel while I enlarge the opening transversely from side to side in order to be able to replace the bowel and examine the adjacent peritoneal surfaces Now the bowel is returned to the abdominal cavity I am excising the scar tissue in the abdominal wall so far as I can and still permit closure of the wound I am trying to overlap the layers of the abdominal wall as much as I can The amount of scar tissue present does not permit the imbrication to be as typical or as extensive as I should like I am closing the skin with silkworm gut and Michel clips *without* drainage The peritoneum usually overcomes the slight infection present in such cases very easily

COMMENTS

These spontaneous ruptures of the abdominal wall are fortunately, not very common This is the second case I have seen and I know of about 40 cases from the literature Some of them are very curious Maetzke (Deut med Wochenschrift for 1910 No 18, p 843), for instance, tells of a patient not unlike ours This patient was a woman who had been twice delivered by cesarean section After the second operation a hernia developed in that part of the wound which had not healed primarily Two years later, while the woman was working in the field, this old scar broke open About 70 cm of the small bowel protruded Although reposition by operation was not attempted until the next day the wound healed without complication except for a small stitch abscess Following the operation, however, the patient took no better care of herself than previously and could not be induced to wear an abdominal bandage Consequently

OPERATION

Since the case is urgent, I have not stopped to make a physical examination except to assure myself that there is no cardiac lesion present to contradict a general anesthetic I had her sent immediately up here to the operating floor
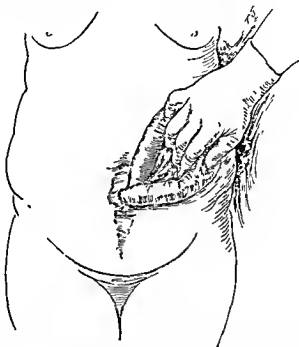
Fig 89 —Spontaneous rupture of ventral hernia in old scar, with protrusion of small bowel. Note the relatively large amount of bowel which has slipped out through the small tear in the center of the scar Until drawn aside by the hand the bowel completely covered the hole, which barely admitted a finger tip alongside the bowel.

We are holding the extruded bowel in moist sterile wrappings away from the skin and are cleaning the abdominal wall with alcohol. As we lift the bowels from the surface of the abdomen, the rupture opening can be seen, and it is astonishingly small for so large an eventration of bowel (Fig 89) It is, I should

patient, a man nearly seventy, was operated on for incarcerated inguinal hernia The wound suppurated, but finally healed The patient was discharged still wearing a bandage Two years later the patient suffered a relapse, and for this he wore a small truss Finally, the skin became superficially ulcerated, and then one day 40 cm of small bowel suddenly protruded At operation it was found that under the skin a pocket had been formed in which there was 40 cm more of bowel the lower 8 or 10 cm of which was firmly adherent to the under surface of the skin A radical herniotomy was performed without any resection of the bowel, the raw areas were covered in the best manner possible under the circumstances Recovery is said to have been uneventful except for a fecal fistula of short duration In separating the bowel from the skin the bowel was accidentally nicked and the cut sewed up The fistula is supposed to have arisen from this site

There are a number of articles on subcutaneous rupture of the abdominal wall with prolapse of the viscera beneath the skin, notably those of Von Saar, Esau, Von Howell, Pneur and Wetzel, Fodereal Hopp Stern, and others There are also a number of reported instances of protrusion of the bowel through the umbilical scar in newborn infants

At any rate, so far as I can find, this spontaneous rupture of abdominal scars seems to be a relatively rare occurrence Perhaps it should be considered surprising that more cases do not occur, in view of the large number of laparotomy scars which we see, where through improper suture of the original wound, or subsequent suppuration or carelessness and neglect on the part of the patient the abdominal coverings have thinned out until only the skin lies above the viscera In some cases the skin becomes so thinned that the intestines cannot only be felt but also actually seen through it, and yet it holds

Nature, as a rule, seems to be kind to these patients The peritoneum is tolerant and the accident usually happens when the patient is enjoying good general health Hence the astonishingly high percentage of recoveries The moral to be drawn from these cases is that bulging hernial or laparotomy scars contain

there was a large recurrence of the hernia into the scar Maetzke reports that the last time he observed the patient the skin had already become so thin over the herniated bowel that he expected a new eventration to occur at almost any time

I ran across reports of 2 cases where just such a second rupture took place, and an operation had to be performed for the second time to repair the eventration Both patients survived the second operation[1]

Loennberg (Nord Med Arkiv , 1911, Festschrift fur J Berg) reports a case like mine A woman, aged fifty, was operated in 1903 for an abscess in the right iliac fossa The wound healed by granulation Four years later, in 1907, the patient first noticed that there was some bulging in the scar Two years later, on March 1, 1909, the patient lifted a heavy washtub, and in straining to do so the thin skin over the hernia ruptured and a loop of bowel slipped out. Three hours later, when the patient was operated on, about 25 cm of small bowel had prolapsed through the opening, which was so small that one finger could barely be passed into it The rupture opening was enlarged, the loop of bowel was washed off and replaced The *wound was tamponed for twelve days* and then a radical operation for hernia was performed Loennberg cites 2 similar cases from the Scandinavian literature He thinks that his method of first tamponing and then performing the radical hernia closure at a second operation is better than the performance in one step In all three cases collected by Loennberg the rupture took place through the hernial scar just as in the 2 cases I have to report.

Rabinow (Prager med Wochen 1909 No 22) reports a rupture of an abdominal laparotomy scar following an operation for tuberculous peritonitis, and thinks that the development of tuberculosis in the scar as a result of the implantation at the preceding operation was the cause of the eventration The rupture in his patient took place exactly two months after her operation

Levy and Roques (Gaz des hôpitaux, 1910 No 117) report a rupture of an inguinal hernial scar with prolapse of the intestine as a result of spontaneous ulceration of the skin The

CLINIC OF DR HERMAN L KRETSCHMER

ALEXIAN BROTHERS HOSPITAL

CARCINOMA OF THE PENIS

Summary A patient with huge ulcerating metastases in each groin secondary to a carcinoma of the penis which had been removed two years previously age incidence etiology lymphatic involvement diagnosis and treatment of carcinoma of the penis

DEMONSTRATION OF A CASE OF CARCINOMA OF THE GROIN

CASE I—Mr W W was admitted to my service in the Alexian Brothers Hospital November 2 1916 He is thirty-four years of age married by occupation a clerk

Two and one half years ago he was operated upon for carcinoma of the penis for which an amputation was performed and the urethra transplanted into the perineum The patient states that he has enjoyed good health for the past two years

About three or four months ago he noticed an enlargement in the inguinal glands He states that they were hard and did not give him any pain Two months ago the glands on the left side broke down and began to discharge this resulted in the production of an ulcer which has been gradually enlarging ever since On the right side the glands are also swollen and tender

Examination General examination is negative Examination of the abdomen is negative Examination of the inguinal region shows that the glands on the left side are enlarged The skin covering these glands is ulcerated and cyanotic There are several areas of suppuration each about the size of a silver dollar On the right side the glands are as big as the hand and on the left side as big as a hen's egg Penis is absent Examination of the scrotum shows the urethra in the perineum just behind the scrotum The testes are negative and rectal

some element of danger as well as of inconvenience to the patient.
Better reoperate in time, excise the scar, and make a new and
stout wall by suitable plastic repair

SUBSEQUENT COURSE IN PRESENT CASE

The patient was put in the Fowler position and given tap-
water per rectum à la Murphy She ran some fever for nearly
ten days following the operation At one time her temperature
was as high as 102° F It was I suppose due to a low grade of
peritonitis The fever gradually came down and the wound
healed uneventfully She continued, however, to have some
abdominal pain from time to time and an occasional flare-up of
temperature to 100° or even 100 5° F Little by little however
the flare-ups became less frequent and the pain gradually sub-
sided No abscess could be felt in Douglas' pouch at any time.
The patient's bowels moved daily, sometimes requiring the aid
of a cathartic. At the end of two months she was discharged free
from pain Her temperature had then been normal, that is not
above 99° F , for two weeks

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extremity has now developed. The left thigh is about one third larger than the right one. Examination of the heart and lung is negative. A roentgenogram of the chest fails to show signs of carcinomatous metastases in the lungs. The liver is negative.

There are several interesting things about this patient. First his age. He was only thirty two at the time that the penis was removed by amputation. According to Kaufman Kuttner and others 75 per cent of cases of carcinoma of the penis occur in the fifth sixth and seventh decades. These figures have been verified by Jahn who in a statistical study of 1161 cases reported in the literature found approximately 75 per cent occurring in the decades just mentioned. Cases occur ring in very young individuals are also reported in the literature but they are very rare. The youngest case is probably that of Creite whose patient was a boy of four years. Fielewicz reported a case in which the tumor grew very slowly in a man of twenty six. In Ralph's case the patient was twenty two. Cases in patients under thirty have been reported by Kuttner Kroenlein Jahn and others.

At the time of his operation the inguinal glands were not removed for what reason I have not been able to ascertain. It would seem that had the glands been removed this recurrence might have been delayed or perhaps entirely prevented. The operation itself has been a very good one as there are no signs of local recurrence.

ETIOLOGY

Nothing definite is known regarding the etiology of carcinoma of the penis any more than is known about the etiology of cancer in other parts of the body. Among the predisposing factors one seems to deserve mention and that is the presence of congenital phimosis to which fact many surgeons interested in this topic have called attention. In a statistical study based on 664 cases congenital phimosis was present in about 45 per cent of the cases Jahn. It is held even that phimosis may be a predisposing factor. Some authors maintain that this disease does not occur in Jews. That persons who have been circumcised may develop carcinoma is known. Prof. Daniel Pcha

operated 5 carcinomas in four years He is connected with the Military School at Constantinople which admits only Mussel men

Although attention has frequently been called to the possibility of contact infection during sexual congress and isolated cases are recorded in which the wife suffered from carcinoma of the uterus and later the husband developed carcinoma of the penis the facts do not warrant the assumption that this mode of transmission is at all a likely one for carcinoma of the uterus is of much more frequent occurrence than is carcinoma of the penis

Psoriasis or leukoplakia preputialis has been described as a result of chronic irritation due to phimosis and it is believed that this favors the development of carcinoma and according to von Winiwarter two thirds of all cases of carcinoma of the penis suffer with phimosis

Carcinomata have developed not only in syphilitic ulcers but also in the scars resulting from venereal sores

Lymphatic Involvement —A peculiar characteristic of carcinoma of the penis is the relatively frequent or relatively early involvement of the lymph glands especially both inguinal glands Occasionally the first glands to be involved are the retroperitoneal glands some of which according to Kuttner are in direct communication with the lymphatics of the penis Occasionally the lymph glands are apparently free in an extensive carcinoma and at other times the amount of lymph gland involvement is very extensive while the tumor itself may be very small

DIAGNOSIS

The diagnosis is usually relatively easy In doubtful cases a piece may be removed under local anesthesia for microscopic examination Just as soon as the diagnosis is made treatment should be instituted and the treatment should be radical Temporizing measures such as sterilization or excision of the growth are all followed by prompt recurrence Diagnosis of carcinoma of the penis is synonymous with amputation of the penis The more radical the operation the better the end results Our patient is now having severe hemorrhages and he

extremity has now developed The left thigh is about one third larger than the right one Examination of the heart and lung is negative A roentgenogram of the chest fails to show signs of carcinomatous metastases in the lung The liver is negative

There are several interesting things about this patient. First his age He was only thirty two at the time that the penis was removed by amputation According to Kaufman Kuttner and others 75 per cent of cases of carcinoma of the penis occur in the fifth sixth and seventh decades These figures have been verified by Jahn who in a statistical study of 1161 cases reported in the literature found approximately 13 per cent occurring in the decades just mentioned Cases occurring in very young individuals are also reported in the literature but they are very rare The youngest case is probably that of Crotti whose patient was a boy of two year Fielewicz reported a case in which the tumor grew very slowly in a man of twenty-six In Ralph's case the patient was twenty two Cases in patients under thirty have been reported by Kuttner Kroenlein Jahn and others

At the time of his operation the inguinal glands were not removed for what reason I have not been able to ascertain It would seem that had the glands been removed this recurrence might have been delayed or perhaps entirely prevented The operation itself has been a very good one as there are no sign of local recurrence

ETIOLOGY

Nothing definite is known regarding the etiology of carcinoma of the penis and more than is known about the etiology of cancer in other parts of the body Among the predisposing factors one seems to deserve mention and that is the presence of congenital phimosis to which fact many surgeons interested in this topic have called attention In a statistical study based on 664 cases congenital phimosis was present in about 50 per cent of the cases (Jahn) It would seem that phimosis may be a predisposing factor Some authors maintain that this disease does not occur in Jews That persons who have been circumcised may develop carcinoma is known Prof Djemel Pacha

Penis The skin is very cyanotic The foreskin is long and cannot be retracted There is a swelling under the foreskin which is very hard and seems to extend from the external urethral orifice back to the sulcus The scrotum is negative The epididymis on both sides are hard and enlarged

Rectal examination is negative

Extremities Negative

The discharge from the penis was examined and showed the presence of pus but no gonococci

Urine analysis showed the following Cloudy acid albumin positive and sugar negative Microscopic examination showed the presence of much pus Cultures of the urine showed the presence of staphylococci

Blood count Erythrocytes 4 960 000 leukocytes 6000 hemoglobin 95 per cent

Because of the fact that one could not retract the foreskin it was decided to do a dorsal slit under local anesthesia This was done three days ago This showed the presence of an ulcerating carcinoma the size of a peach stone The carcinoma extended from the external urethral orifice back through the corona glandis The carcinoma extended into and involved the glans penis so that the left half of the glans has been replaced by carcinoma The carcinoma extended on to the inner leaf of the foreskin

Microscopic examination of the small piece which was excised under local anesthesia verified the clinical diagnosis of epithelioma

The diagnosis therefore having been definitely made of a carcinoma with involvement of the lymph glands it was decided to do a radical extirpation We will do this operation this morning We will try and remove the entire organ and the lymph gland in one mass thereby avoiding opening up the lymph channels From our examination of the patient it is perfectly clear that nothing short of a radical operation can hope to give him any relief The case previously demonstrated shows the value of removing the lymph glands as a routine which procedure we always do whether the glands can be palpated or not

is losing rapidly in weight and strength Death in these cases of recurrence is usually due to one of two things either hemorrhage or sepsis

CASE II —The second patient that I should like to present who is suffering from a carcinoma of the penis is Mr J R aged sixty nine, married, by occupation a clerk There is nothing in the family history of any moment as bearing on the patient s present illness

Previous History —Measles typhoid and pneumonia When twenty years of age the patient had a chancre, but he does not remember the exact location of it It is interesting to note this fact from the standpoint of the possibility of his carcinoma being ingrafted on the scar of the chancre as mentioned previously when I considered the etiology

*Present Complaint —*The patient states that the present trouble began about six months ago with the appearance of a small hard lump in the foreskin This he states has gradually increased in size He says that this nodule was painful as soon as he noticed its presence The patient furthermore states that there has been present a dirty brownish discharge appearing soon after he noticed the onset of his present trouble The patient also complains of difficulty in passing his urine which doubtless is due in part at least to the fact that the foreskin cannot be retracted The swelling and induration of the foreskin began about five months ago and have increased since that time

*Physical Examination —*The patient is a white male apparently sixty nine years of age weighing 140 pounds and well preserved for his age There are no gross deformities Head neck eyes ears nose and mouth are negative The neck is negative and there is no evidence of enlarged cervical lymph nodes The lungs show the presence of a few moist rales in both apices There are no areas of dulness The heart is negative The abdomen is negative There are no areas of tenderness and the liver is not enlarged

Inguinal glands The inguinal glands on the right and left sides are enlarged and can be palpated very easily The glands on the left side are tender to palpation

Penis   The skin is very cyanotic   The foreskin is long and cannot be retracted   There is a swelling under the foreskin which is very hard and seems to extend from the external urethral orifice back to the sulcus   The scrotum is negative   The epididymi on both sides are hard and enlarged

Rectal examination is negative

Extremities   Negative

The discharge from the penis was examined and showed the presence of pus but no gonococci

Urine analysis showed the following   Cloudy   acid albumin positive and sugar negative   Microscopic examination showed the presence of much pus   Cultures of the urine showed the presence of staphylococci

Blood count   Erythrocytes   4,960,000, leukocytes   6000 hemoglobin   95 per cent

Because of the fact that one could not retract the foreskin it was decided to do a dorsal slit under local anesthesia   This was done three days ago   This showed the presence of an ulcerating carcinoma the size of a peach stone   The carcinoma extended from the external urethral orifice back through the corona glandis   The carcinoma extended into and involved the glans penis so that the left half of the glans has been replaced by carcinoma   The carcinoma extended on to the inner leaf of the foreskin

Microscopic examination of the small piece which was excised under local anesthesia verified the clinical diagnosis of epithelioma

The diagnosis therefore having been definitely made of a carcinoma with involvement of the lymph glands   it was decided to do a radical extirpation   We will do this operation this morning   We will try and remove the entire organ and the lymph glands in one mass thereby avoiding opening up the lymph channel   From our examination of the patient it is perfectly clear that nothing short of a radical operation can hope to give him any relief   The case previously demonstrated shows the value of removing the lymph glands as a routine which procedure we always do whether the glands can be palpated or not

Incis on

1

2

U ethre

T

3

Corpus cavenco sm Urethra

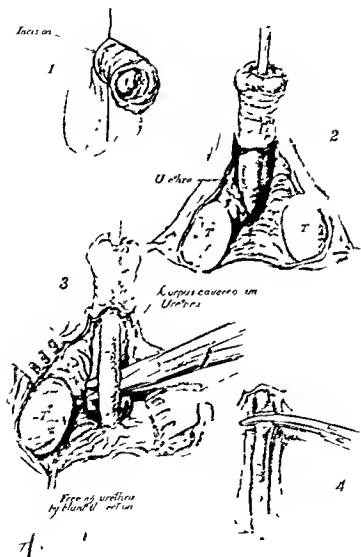*Fen of urethra by blunt d ection*

4

Fig 92

Operation—The patient is placed in the lithotomy position. A steel sound is now inserted into the urethra. We will begin our incision from the symphysis pubis passing downward to the root of the penis. We will carry this incision to each side of the penis so as to encircle it. The two lines of the incision will meet in the median line below the penis from which point the incision will be carried down in the median raphé to the perineum (Fig 92 1). We will now bisect the scrotum and by a blunt dissection separate both testes without opening the tunica vaginalis (Fig 92 2). We are now carrying this dissection down to the corpus spongiosum by means of a sponge dissection. The corpus spongiosum with the sound can easily be seen and felt as it is dissected free from its attachment to the corpora cavernosi. We will continue this dissection so that we may free the urethra as far back as the anterior leaf of the triangular ligament. At this point we will remove the sound and the urethra having previously been clamped by an artery forceps will now be cut across (Fig 92 3 4). We will now carry the incision around the root of the penis down to its fibrous sheath and we will divide the suspensory ligament at this point. Both corpora are freed by blunt dissection as far back as the crura. The cavernous tissues are divided having first clamped the crura with heavy artery forceps. A ligature is placed around the crura in order to ligate the artery at this point (Fig 92 5). The crura are now dissected upward and freed (Fig 92 6). The dorsal artery and vein which now come into view are ligated.

The crura and distal part of the urethra have been removed in one mass and will be allowed to lie for the time being upon the side. The urethra which has been divided will be split and attached to the lower angle of the wound by two or three catgut

Fig 92—1 showing the first incision which begins above the root of the penis carried down to the penis which it encircles and the two encircling incisions meet in the median line from which point they are carried on the median line 1 the scrotum to the perineum. On the left side the edge of the carcinoma can be seen 2 The scrotum has been bisected. The tunica vaginalis has not been opened. The urethra with a sound in place and the corpora cavernosi are outlined 3 freeing the urethra by scissors dissection from the corpora cavernosi 4 A clamp is placed on the urethra prior to cutting it
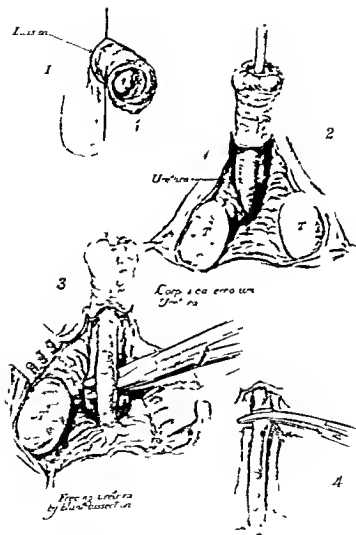
Fig. 92.

sutures The cavity is now packed lightly with iodoform gauze and the usual closure will be made (Fig 93 7 9)

Now we will change the patient's position He will be taken out of the lithotomy position and placed flat on his back An incision is now made parallel with Poupart's ligament beginning at our original incision and extending outward and upward to the anterior superior spine of the ilium By blunt dissection the inguinal glands and fat are removed in one mass (Fig 94 10) As previously stated our object is to remove the glands on both sides of the penis in one mass so that the lymph vessels are not opened This we have succeeded in doing very well on the left side On the right side, however as the dissection proceeds the glands are detached from the large mass, so that these glands will have to be removed separately Now this dissection is completed and the penis and lymph glands are removed in one mass The dissection has been carried down to the external oblique and at this point you will see the cord where it leaves the external ring These two cavities the right and left inguinal canals will be packed with iodoform gauze The deep layers will be closed with catgut and the skin with silk (Fig 94, 11) A soft rubber catheter is now inserted into the urethra and is stitched to the skin This catheter we will allow to remain for three or four days at the end of which time it can be removed and the patient then proceeds to spontaneous urination

We believe that if these patients are subjected to operation for their cure and a radical operation is done the end results are very good I recently saw two patients who were operated upon elsewhere and on whom this procedure was carried out Both are still alive after eighteen years In both instances a diagnosis of carcinoma based on histologic examination had been made

Fig 93—5 The urethra has been severed showing the corpora cavernosi and the urethral groove A ligature has been placed around the crus close to its insertion 6 The corpora have been freed and are lifted up Both crura have been ligated The dorsal vessels and nerve are seen 7 8 Fixation of the urethra into the lower angle of the wound 9 The urethra has been split and fixed to the skin by two catgut sutures prior to the introduction of a permanent catheter
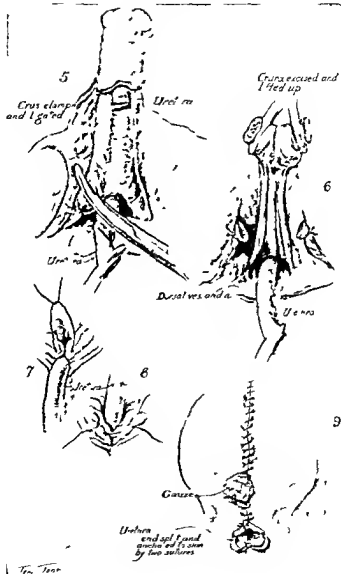
Fig 93.

IMPOTENCY ITS TREATMENT BY TRANSPLANTATION OF TESTICLE

S m

WHILE potency is not essential to life potency is very essential to the happiness of most individuals   Physicians should not only try to save life but also attempt to correct deformities and conditions that interfere with full enjoyment of life   Hence any one who develops means or methods of relieving impotency will increase the sum of human happiness very much

The study of impotency must embrace a study of the whole domain of medicine in order to enable one to make an etiologic diagnosis and subsequently to carry out the treatments directed to the structures definitely at fault

CAUSES OF IMPOTENCY

1 Loss of testicles
   (a) By accident
   (b) By disease
2 Psychic changes
3 Structural changes in central nervous system particularly injuries and diseases of the spinal cord
4 Hypoplasia of the testicle
   (a) Congenital
   (b) Acquired (internal secretion cases)

DIAGNOSIS

The accident cases are easily diagnosed from the history of a scrotal trauma   The examination shows absence of the testes
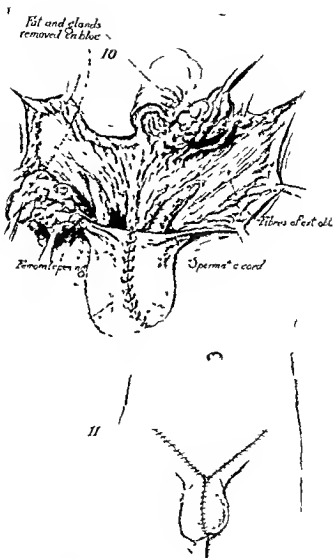
Fig 94—10 The penis and inguinal gland and fat on the left side were removed in one mass The right mass of glands was removed separately 11 Closure

it may be—surgery for the cord tumor cases and intensive intra
venous and intraspinal salvarsan treatment for the tabetic

Hypoplasia (Congenital)—I have never observed a case of
hypoplasia of the interstitial elements of the testicles with pres
ervation of the spermatogenic tubules, although Cushing pic
tures such a case with normal development of the spermatogenic
tubules and with practically no interstitial cells of Leydig The
boy had never acquired complete secondary sexual character
istics Hypoplasia of the spermatogenic elements of the testicle,
with preservation of the interstitial tissues and large numbers of
cells of Leydig is a relatively common condition These patients
are not impotent at all but perfectly normal as regards sexual
abilities although they are sterile and usually come under ob
servation for that condition Patients who show a complete
absence both of the spermatogenic elements and the cells of
Leydig are relatively common The testicle in these individuals
is just a little mass of connective tissue In this connection it is
interesting to quote a case of Cushing's, in which there was a
marked excess of the interstitial tissue and large numbers of
the interstitial cells of Leydig The seminiferous tubes were of the
preadolescent type The individual showed marked precocity
as regards secondary sexual characteristics

These conditions are easily accounted for if we bear in mind
the embryology of the testicle The indifferent sex glands of the
embryo are composed of two distinct structures the superficial
epithelium and the stroma The superficial epithelium forms the
interstitial cells of Leydig—the cells which are responsible for the
internal secretion of the testicle The stroma forms the spermato
genic tubules of the rete testis The Leydig cells are quite abun
dant up to about the fifth month of pregnancy, then they begin to
disappear, and about the seventh month there is only an occa
sional Leydig cell present At puberty the Leydig cells reappear
in considerable numbers Clinically these congenital hypoplasia
cases are diagnosed by the persistence of childish characteristics
and by the absence of the secondary sexual characteristics of the
male or the development of certain female characteristics, such as

and various scars on the scrotum. Likewise, the destruction of the testicles by disease is readily determined by the history, and physical examination shows the testicles more or less atrophied, depending upon the severity of the disease. Usually they appear as small, soft masses at the end of the cord, varying in size, depending on the amount of atrophy. The epididymis may or may not be present and may or may not be normal if present.

Psychic Types —In the psychic types of cases we make the diagnosis not from any one point, but from a complete history and examination. The patients are usually young adults between twenty and thirty years of age. They give a history of normal sexual abilities up to a certain time, and since that time their powers have been deficient. Their disability dates from some specific occurrence, at which time they failed to have complete satisfactory intercourse. This fact startles them and starts them to thinking about their sexual powers, and they become markedly introspective and begin wondering if they are really losing their sexual ability. At the next attempt they are fearful of failure, and failure occurs which fact causes more perturbation and on any subsequent attempt at intercourse failure occurs. The circle is kept up, and soon they present a well marked case of psychic impotency. A physical examination of these patients shows that they are organically sound, but they are usually of the so-called nervous temperament. The treatment is directed to breaking this vicious circle best by psychic means either by psycho-analysis or by using some infusive drug or other method that will make a profound impression on the patient, such as a dye to color the urine red or a very bad tasting mixture, with the advice that its therapeutic strength is in direct proportion to its nauseating properties.

The *structural type* of case is one in which there is a definite organic lesion of the nerves and is due to sections of the spinal cord, tumors of the spinal cord and tabes. According to Church, 58½ per cent. of tabetics have a diminished or complete loss of sexual powers. The treatment of impotency due to these conditions is the treatment of the basic causal condition whatever

will obtain betterment up to a certain point but usually this improvement is far short of real relief Feeding with the deficient gland may be effective If the deficient gland is in doubt, give the patient the benefit of the doubt and administer a shot gun prescription composed of anterior lobe of the pituitary adrenal cortex and interstitial cells of the testicle mixed in one capsule With these feedings many cases will be relieved but where they fail we should do a homotransplantation of the testicle To my mind the disabilities of these individuals is due either to a lack of the internal secretion of the testicle produced by the Leydig cells alone or the symptoms are produced by a lack of the internal secretion of the testicle anterior lobe of the pituitary and adrenal cortex in combination

The case we have to operate on today is one of these cases of acquired absence or deficiency in the secretion of the Leydig cells We have determined to transplant a normal testicle into him

The patient is a man about fifty five years of age He is in perfect health and vigor in every way but sexually He has noticed a gradual diminution of his sexual abilities for the last ten years so that at the present time he is absolutely impotent He has normal sexual desire but erections do not occur at all

Examination—The heart lungs face and neck are negative Blood pressure is 140 pulse 71 Arteries are soft Abdomen is negative The penis is small and its skin is in folds Mucosa of the glans penis is wrinkled The testicles are about one-half the normal size soft and flabby Prostate and seminal vesicles are normal Urethroscopic and cystoscopic examinations have not been made

Sugar tolerance 150 grams of glucose were given by mouth At hourly intervals thereafter the bladder was emptied and the urine tested with Fehling's solution with the following results

Slight reduction in one hour
More in two hours
Good sugar in three hours
Good sugar in four hours
Slight in five hours
None in six hours

breasts, femmne distribution of hair, adiposity, and fine texture
of the skin

In my experience the largest group of impotency cases is the
internal secretion group, as I have called them These are men
from thirty five to sixty years of age usually of good physical
development, who have been active in business and social life
They may or may not have had some venereal disease but if they
have, it is, as a rule, of no consequence in relation to their present
condition They simply come for relief from the gradual failing
of their sexual powers The history shows that their failure has
been gradual, that in their early twenties they were either normal
or, as many of them think, they were abnormally potent They
indulged excessively in intercourse, and now, at about forty, they
find that intercourse is possible but seldom, if at all

A general physical examination is usually negative. The
examination of the genitalia shows a penis whose skin is flabby
and whose glans is usually wrinkled and inclined to be cold The
testes are slightly smaller than normal and are quite soft, giving
the impression that they had been larger and had shrunken in the
tunica albuginea Urethroscopically, as a rule they are negative
as to any condition that has any influence upon their potency
When examined as to the glands of internal secretion many of
them will show some slight symptoms of deficient action of the
pituitary or adrenal other than impotency Their sugar toler
ance may be a little but high and the pulse a little slow There
may be a little excessive development in the breasts, adiposity,
and a slight deficiency in the beard The blood pressure is low
They may have any one or all of these changes It is surprising
how many of these cases will fit in in a small way with the symp-
tomatology of a well-developed case of pituitary disease One of
my cases upon whom I diagnosed pituitary impotence seven
years ago, has since developed well marked pituitary disease for
which he has been operated on

TREATMENT

If we remove all toxic elements from these patients such as
smoking and drinking, and regulate their diet and exercise we

will obtain betterment up to a certain point but usually this improvement is far short of real relief. Feeding with the deficient gland may be effective. If the deficient gland is in doubt, give the patient the benefit of the doubt and administer a shot gun prescription composed of anterior lobe of the pituitary adrenal cortex and interstitial cells of the testicle mixed in one capsule. With these feedings many cases will be relieved but where they fail we should do a homotransplantation of the testicle. To my mind the disabilities of these individuals is due either to a lack of the internal secretion of the testicle produced by the Leydig cells alone or the symptoms are produced by a lack of the internal secretion of the testicle anterior lobe of the pituitary and adrenal cortex in combination.

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More in two hours
Good sugar in three hours
Good sugar in four hours
Slight in five hours
None in six hours

Technic of Operation —The technics that have been used in the transplantation of testicles are

1 Blood vessel anastomosis of which there are two types the direct end to-end union of the spermatic artery and veins and the so-called Patching operation neither of which are of any particular value

F 9 Low power of a transplanted testicle down two months after operation Note the complete absence of muscle in the permanent tubules Note also the increase of the interstitial tissue between the tubules

2 Transplantation *en masse*—of doubtful value

3 Transplantation by morcellation—the method which we shall follow

We make an incision through the skin and fat down to the rectus muscle separate the fibers of the rectus muscle with an

artery forceps, and examine the space so made to be sure there is
no hemorrhage This constitutes the bed into which the pieces
of testicle will be carried Now we make a similar incision on the
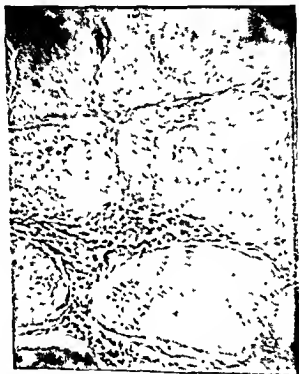opposite side of the midline and prepare our bed in the rectus

Fig 96 —**
of several sper
spermatic tubi
pictures

muscle in the same way Next we cut the testicle into slices
about 1 to 2 mm thick, denuding them of tunica albuginea
These slices are placed into the bed previously prepared in the
rectus muscle the sheath of the muscle sewed with catgut, the
skin sutured with silkworm gut, and a collodion dressing applied

We may expect results to become manifest in a few weeks In some instances these may be permanent but in many cases we must be prepared to find our transplants completely absorbed in the course of a few months with of course coincident effacement of any benefits which may have accrued to the patient It is of interest in this connection that the Leydig cells are much more virile than the spermatogenetic elements and in experimental amounts retain their staining properties for days after definite necrosis of the tubule cells of transplanted testicles has occurred (Figs 95 96)

It is not always an easy problem to obtain material for transplantation into these patients The ideal testicle for transplantation would be that obtained from a vigorous healthy man which could be implanted in its new location without delay and which previous serologic tests had shown would not be incompatible with the patient s tissues or body fluids Such material for obvious reasons is beyond the reach of surgeons in the great majority of instances We are forced to rely for material on the occasional case of accidental death or suicide in which we can rule out syphilis and from which the testicles can be removed aseptically as soon after death as possible Apparently successful transplantations have been done with material which had remained in the unrefrigerated body for from seven to twelve hours We prefer however to obtain the material without unavoidable delay Immersed in physiologic salt r Ringer s solution tissues freshly removed from a body recently dead may be preserved in the ice chest for twenty four hours before transplantation although even that short interval is undesirable and may be fatal to the results

CLINIC OF DR JOHN L. PORTER

St Luke's Hospital

TENDOPLASTY FOR PARALYTIC TALIPES VALGUS

Summary Mechanism of the development of deformity following infantile paralysis, substitution of active for paralyzed muscles technic of transference of tendon of peroneus longus to insertion of tibialis posticus—insertion of suture into tendon—utilization of sheath of paralyzed tendon—subor osteal suture of transplanted tendon arthrodesis on astragaloscaphoid joint after-treatment—plaster cast and prolonged protection from overstrain.

October 6, 1917

WE have today a very interesting case of infantile paralysis illustrating two different types of deformity following the paralysis

This youngster is ten years old Three years ago he had an attack of poliomyelitis anterior, and as a result he has two different types of paralysis in the two legs

I ask him to hold the right leg up straight, and he says he cannot I also ask him to lift it up and put it on the table, and again he says he cannot You see the flexion of the thigh when he is sitting depends on the function of the iliacus and psoas muscles The extension of the leg depends upon the contraction of the quadriceps extensor He cannot hold up his leg He has lost the power of his quadriceps extensor He can pull his foot up, but he cannot push the foot down just because he has lost the calf group in this right leg and the tendo achillis is very weak, although not completely paralyzed The heel has a tendency to drop down so (indicating) when he walks so that he has a very awkward gait because he is unable to lift his weight over his toes When you carry your weight forward you use the calf muscles to lift the weight over the foot This leg therefore, presents a paralysis of the iliacus, psoas and quadriceps

extensor muscles in the thigh and the soleus and gastrocnemius in the leg They are the so-called extensors of the foot.

Now we will examine the left leg I ask him to put this foot up on the table He has his iliacus and psoas in that leg because he can lift the thigh on the abdomen when he is sitting He has the quadriceps extensor because he can hold the leg extended. When the foot is lifted in extension it turns out in a condition of pronation When the foot comes up extended it comes up pronated, showing that the peroneal group—the peroneus longus and brevis—are active, while the tibialis anticus and posticus are not. These muscles are internal extensors which pull the foot up supinated, and when they become paralyzed marked disability and deformity is always produced. This boy cannot walk flat on his foot. Any foot that is pronated is a disabled foot. Supination is the normal walking position. In order to give him a good walking gait and a good useful leg both legs have to be taken care of, but we propose to begin with the left and to transplant the peroneus longus to the inside of the leg and give him a foot which can be supinated and held there, enabling him to walk on the outside of the foot this way (indicating) instead of walking on the inside of the foot this way (indicating) which is a very painful, uncomfortable and disabling gait. In this right leg on account of the presence of some power in the calf muscles —and remember that in poliomyelitis anterior we frequently see part of the muscles paralyzed and not the entire muscle—it is our intention to put the foot up in a plantar flexed position like that and hold it there in plaster of Paris and give the tendo achillis a chance to contract at the same time stretching out the extensor tendon in the dorsum of the foot. It is a physiologic law that when muscles or tendons are relaxed they have a tendency to contract and they do contract. If we can hold that foot long enough we can get that tendo achillis straightened out. After the cast is off we frequently put on a brace which holds the foot in that position. He can then put on a shoe over the brace and walk with the heel slightly elevated and the knee slightly bent. It does not do for him to wear the shoe during the day and take it off at night. Whatever apparatus is put

on to overcome the contraction of the overstretched tendon must be worn constantly   While we are operating on the left foot we will put the cast on this leg, which will hold the foot down and hold the knee straight in an extended position and keep it there until the tendo achillis has had a chance to straighten up enough to enable him to get along without a brace   After we finish with that foot, if the tendo achillis and its muscles do not develop enough to hold the foot in extension, we can easily do a Gallie operation and so hold the foot in extension

Operation—It is necessary in doing these tendon transplantations to use a constriction on the limb so that the field of operation may be practically bloodless   It not only facilitates the operative technic, but it is much better so far as the reparative process is concerned not to have the tendon and tendon sheath surrounded by large clots of blood which have to undergo organization and absorption   We try to keep the operative field as free from blood as possible for that reason   Let me say that in putting on a constrictor it is always wise to protect the skin by putting a towel between the constrictor and the skin   If you take a rubber constrictor of the type which is usually used—1 inch wide strong elastic rubber—and put it around the leg without first putting on a towel, it will often result in a very uncomfortable sore place from the prolonged pinching of the skin between the layers of rubber   If you put a towel between it and the leg the towel prevents the skin from becoming pinched and adds much to the patient's comfort

I want you to see the peroneus longus tendon when I attempt to supinate the foot   You see the peroneus longus takes its origin up in the calf muscles, runs down behind the external malleolus, underneath the base of the fifth metatarsal bone, across the body of the foot, and becomes attached to the head of the first metatarsal on the inside of the foot   The tibialis anticus and posticus are gone and the muscles on the opposite side of the joint keep on shortening and shortening until the deformity which you see here and which is known as valgus is produced by three things   First, gravity pulling the foot downward, second the weight of the body pulling on the foot in a

distorted position, and, above all, the contraction of the non-paralyzed muscles There are three factors producing the deformity and we propose to do away with them by transplanting the non paralyzed tendon from the position where it is doing no good to a position where it will be useful Second, we are going to make sure of the usefulness of that tendon by producing an arthrodesis on the inner surface of the foot between the scaphoid and astragalus, that is we do away with the joint that exists between the scaphoid and astragalus and make one solid bone in other words, an arthrodesis Then we put the foot up in plaster of Paris and hold it there until the tendon has had a chance to contract and become attached to the bone on the inside of the foot and until the region of the obliterated joint has become solid.

A long incision is made from the belly of the muscle along the peroneus longus tendon down to the outer side of the foot where it passes underneath the fifth metatarsal bone The tendon sheath is opened in this way, exposing the tendon That at once exposes the peroneus longus tendon right down to the angle on the outer surface of the foot where it passes underneath the fifth metatarsal You can see the size of the tendon You can see the tendon sheath I have bared the tendon and here is the tendon sheath You see how very thin the tendon sheath is and how large the canal is underneath the fifth metatarsal where the tendon passes across the bottom of the foot That tendon is picked up and isolated from the surrounding tissue Then the tendon is sharply divided way down in the canal as far as you can go so as to get as long a tendon as possible Now in taking that tendon out of its sheath we do so because we do not need the tendon sheath, as we are going to supply a new one We take care not to disturb the lateral ligaments I do not split the tendon sheath all the way up because if I do I would partly destroy the lateral ligaments but I split the tendon sheath above and below the lateral ligaments and then pull the tendon through (Fig 97)

Now the tendon is ready to be transferred to the other side of the foot The first step will be the insertion of the silk sutures.

In putting the silk into the end of the tendon it is very necessary not to constrict the tendon enough to shut off the circulation,
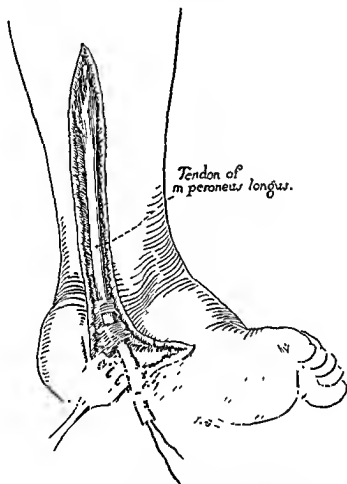

Tendon of m peroneus longus.

Fig 97—Tendon of peroneus longus dissected out, leaving the lateral ligaments of ankle Note method of attaching silk suture

because you see we have denuded the tendon of its sheath, and as the circulation of the tendon was largely carried in the small vessels of the tendon sheath, any constriction of the tendon may

seriously impair its blood-supply. Consequently, the needle is introduced in the end of the tendon and is carried up through the tendon longitudinally and then across at a right angle, and then back again on the other side in a longitudinal direction, both ends of the silk coming out through the end of the tendon. You see how strongly that is attached and yet I have not constricted the tendon in any way. In order to make sure, because there is going to be a good deal of traction on this particular tendon, I carry the suture back in this way and through once more. Now I have the silk anchored to the end of the tendon in such a way that it will not pull out (Fig. 97).

Now we turn the foot over and look for the tendon of the posterior tibial, which is a paralyzed tendon. The tendon will be smaller, of course, on account of some atrophic changes because of the lack of function. We know the tendon comes across behind the malleolus, attaching at the inner border of the scaphoid and along the base of the first metatarsal bone. We shall make a small incision over the place where we think the tendon ought to be. You see the tendon right at the bottom of the long incision, lying in this groove behind the internal malleolus. It is very easily picked up and demonstrated to you. I am not going to use it because the muscle from which it takes its origin is paralyzed. I am simply going to use the sheath in which that tendon is buried to manufacture an artificial sheath for the peroneus longus which I am going to bring over on this side of the foot. I carry this probe right up the sheath of the posterior tibial until it arrives opposite the body of the peroneus longus. With a blunt dissector I split the tendon sheath and draw the tendon out. You see the end of the probe has gone up to the body of the posterior tibial muscle in the sheath of the posterior tibial tendon and I have ˙

the foot, and it becomes a supinator instead of a pronator. I have brought the new tendon down on the inside of the foot to take the place of the posterior tibial I have taken the tendon from the outside, where it was a pronator and where it was pull-

ing the foot outward in a desperate position and transferred it to the inside of the foot where it becomes a supinator and actively useful

Now the next thing is to fasten that tendon This tendon is carried right down and inserted at the periosteum at the point
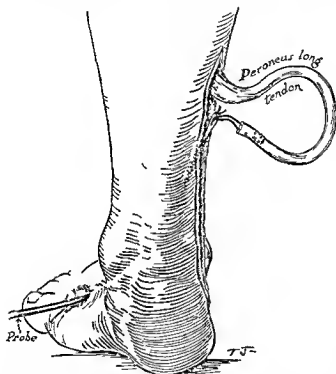
Fig 98—Probe inserted in sheath of tib ahs post cus passed through the inter muscular septum and attached to end of peroneus longus tendon

of insertion of the posterior tibial I want most of you to see the depth of the insertion of that little paralyzed tendon Here is the posterior tibial a little small weak tendon There is its point of insertion underneath the scaphoid and the base of the first metatarsal Here you see coming down in the same sheath a strong active functioning tendon which we propose to put in

seriously impair its blood supply Consequently the needle is introduced in the end of the tendon and is carried up through the tendon longitudinally and then across at a right angle and then back again on the other side in a longitudinal direction both ends of the silk coming out through the end of the tendon. You see how strongly that is attached and yet I have not constricted the tendon in any way In order to make sure because there is going to be a good deal of traction on this particular tendon I carry the suture back in this way and through once more Now I have the silk anchored to the end of the tendon in such a way that it will not pull out (Fig 97)

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the foot and it becomes a supinator instead of a pronator I have brought the new tendon down on the inside of the foot to take the place of the posterior tibial I have taken the tendon from the outside where it was a pronator and where it was pull

Now it is my intention to carry that tendon right into the periosteum, and in order to do that one end of the silk is carried into the slit and out through the periosteum on one side, and the other end is carried in through the slit and out through the periosteum on the opposite side (Figs 99 and 100) You see,
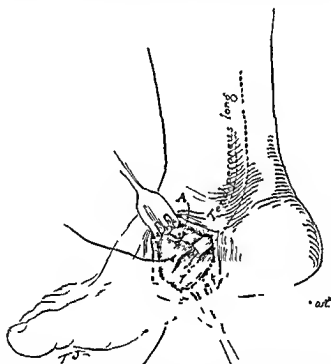
Fig 99 —Tendon of peroneus longus brought down in sheath of tibialis posticus and first anchoring stitches introduced through the split periosteum The closed wound is shown at A where the articular surfaces of the scaphoid and astragalus have been denuded and the capsule repaired

with both ends tied, this suture brings the end of the tendon right down into the periosteal slit and at the same time sews the periosteum over the end of the tendon The object is to get the end of the tendon below the periosteum I have sutured the peroneus longus tendon subperiosteally at the base of the

the place of the posterior tibial to take up the function of supina
tion instead of pronation In order to make that more success
ful and take some of the strain off the tendon we anky lose the
joint between the scaphoid and astragalus, and that is done in
this way Here is the inner border of the scaphoid Here is the
astragalus By careful dissection we take away the ends from
both bones and let them grow together as one bone I have
split open the capsule that covered the astragaloscaphoid articu
lation right here Now my knife is right in the joint That
little incision opens the articulation between the scaphoid and
the astragalus Remember in these little youngsters the articu
lar surfaces are not only cartilaginous, but the greater part of the
bone is cartilaginous and it only takes a little effort to separate
them I have taken off the end of the astragalus where it artic
ulates with the scaphoid I am taking off the articulating sur
face of the scaphoid You see the end of the bone with the car
tilage taken off and the bare bone left I split the capsule in that
direction in order to expose the articulation of the two bones
when I close this incision it has the effect of bringing the end
of the scaphoid up against the astragalus Closure of the inci
sion amounts to a reconstruction of the capsule and of the astrag
aloscaphoid ligament both of which were partially severed in
exposing the joint I shall reinforce my first suture line by
placing over it a second layer of stitches After I tie that suture
it practically closes the entire incision in the capsule and pulls
the denuded surfaces of the bone together Now I have closed
up the gap in the capsule and in the ligament and we are ready

I sew this tendon which I have brought down We never sew
one tendon to another, though both tendons may be alive If
we want to transplant a tendon we sew the transplanted tendon
right to the bone That is done so that it may develop an attach
ment similar to its normal attachment, one which will withstand
the wear and tear of daily use In order to suture the tendon
to the bone I have split the periosteum like that (indicating)

skin Every once in a while in tendon transplantations in which the tendon lies close to the skin and has not been covered with fascia the tendon becomes attached to the cutaneous scar so that tendon and skin move together We simply sew the fascia over the tendon and then sew up the skin There must be no tension on that tendon from now until we get it into the plaster of Paris cast The original incision through which we exposed the constrictor and you will see how little bleeding takes place Now we will remove the constrictor and you will see how little bleeding takes place As long as we cut only the skin, fascia, and fibrous tissue and do not make an incision into the muscle there is but little bleeding You notice that the annular ligament of the joint is undisturbed

first metatarsal, and if the silk holds the tendon will grow to the bone, and I will have converted a useless tendon into a tendon that is of value to the patient

I have been annoyed in this operation more by oozing of blood than usual Generally the constriction is sufficient. I

Fig. 100 —The peroneus longus tendon anchored in the periosteum. The sutures include both periosteum and tendon.

think the constrictor was put on a little hurriedly without waiting to evacuate the blood from the small vessels

You can easily see the peroneus longus tendon at the bottom of the wound sutured to its new attachment Now it is very necessary to cover that tendon with fascia before closing the

HALLUX VALGUS

Summary Hallux valgus a fashion deformity—mechanism of its production pathology of bunion palliative treatment operation affords only hope of relief in advanced cases technic of operation

THIS patient, a male aged fifty, came to the hospital because of a double hallux vagus There is no history of previous illness or injury to the feet The history of the present trouble dates back ten years, when patient first noticed a prominence at the right metatarsophalangeal articulation This condition, at first only slightly annoying became painful after a number of months In an effort to avoid putting his full weight squarely on his right foot most of the weight was thrown upon the left foot Finally, an enlargement was noticed at the metatarsophalangeal articulation of the left foot The narrow toed shoes which were being worn at that time, caused this patient's trouble very materially, and eventually brought about a very marked deformity of the foot (Fig 101)

Hallux valgus has always been spoken of as a fashion deformity, and is considered a disease arising from the wearing of boots which are narrow toed This causes abduction of the great toe, until finally overlapping of neighboring toes takes place The great toe may lap over the second and third toes or the second and third toe may occasionally overlap the great toe Normally the great toe extends directly forward from its metatarsal joint and slightly adducts and flexes when the patient takes a step Abduction of the great toe is an abnormal deformity and may become very extreme under certain conditions As the toe is slightly abducted the patient, to avoid pain, pushes the foot off the ground from the inside instead of using the proper heel and

internal capsule of the joint becomes stretched and thin and occasionally perforated   The external portion of the capsule becomes shortened and thickened   Very frequently the false bursa becomes inflamed and occasionally infected   Infections in this position may give rise to a very severe cellulitis and by extension a severe arthritis in the metatarsophalangeal articulation   The flexor tendon of the great toe instead of lying well underneath the metatarsophalangeal articulation is displaced outward and the sesamoid bones which lie in it may become displaced externally to the head of the bone and may further act as a wedge to push it inward and thus increase the deformity (Fig 101)   The extensor tendon frequently becomes shortened and acts as a bow string in drawing the tip of the toe upward and outward

The palliative treatment for the relief of hallux valgus should be greatly discouraged except in the very earliest stages   When a bunion is very small and not extremely painful a properly fitted shoe with a heavy stiff sole may afford some relief   The wearing of pads of felt between the first and second toes sometimes lessens the deformity   As a rule toe posts in the shoes have not proved very satisfactory   Various forms of bunion splints are on the market and have been recommended but usually the parts are so sensitive that even these appliances cannot be worn comfortably   Of all the palliative measures which have been recommended a proper arch support of both the longitudinal and transverse arches has given most relief   Daily manipulation with mild massage over the outer and upper aspects of the articulation may act in keeping the tendons and ligaments stretched   In advanced cases only operative treatment should be tried There are four distinct steps in the operation for hallux valgus 1   Removal of the false bunion which in itself is quite useless 2   Amputation of the hypertrophied portion of the head of the metatarsal bone or excision of the entire head   3   Removal of the sesamoid bones from the flexor tendon   4   Elongation of the extensor tendon in those cases where the great toe overrides the next toe   The incision is made over the inner and dorsal aspect of the articulation (Fig 101) thus exposing the capsule of the joint

toe method of walking. As the toe turns outward it necessarily impinges upon the second toe and pushes backward and inward at its own metatarsophalangeal articulation. This causes a prominence at that point, and by the constant irritation of the shoe on the bones a greatly enlarged and thickened bursa forms over the head of the bone in that position. By means also of the continued irritation the head of the metatarsal bone becomes
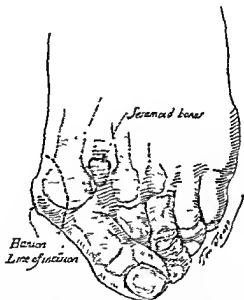

Fig. 101.—Marked hallux valgus deformity Note position and size of sesamoid bones in flexor tendon, which may have caused the abnormally wide space between the metatarsals at this point. Line of incision for operation is shown.

enlarged and an exostosis together with a marked thickening of the periosteum appears on the inner and dorsal aspect of the metatarsal bone. By further abduction of the toe a lateral subluxation takes place, and because of the wedge-like action of the base of the subluxated phalanx the first metatarsal is pushed upward and inward leaving a wider space than normal between the heads of the first and second metatarsals (Fig 101) The

The false bursa is first exposed and can be easily dissected out (Fig 102, 1) Then by an incision through the capsule of the joint the enlarged and deformed metatarsal head is exposed The toe is drawn downward and with large bone forceps or chisel the hypertrophied portion may be removed or the entire head of the metatarsal bone is amputated (Fig 102 2) The raw end of the bone is then shaped as nearly as possible like the original head By extending and flexing the great toe the flexor tendon with its sesamoid bones comes plainly into view (Fig 102, 3) The sesamoids must be removed An incision is made into the tendon and the sesamoid bone is grasped and evulsed (Fig 102 4) The removal of the sesamoid bones frequently as in the case which I am demonstrating requires one half of the time for doing the complete operation They are very frequently firmly adherent to the tendon itself Care must be taken not to divide the tendon entirely If this accident should happen the ends must be re-approximated and sutured Without making a new incision the sheath of the extensor tendon is exposed opened and the tendon drawn out This tendon must be lengthened usually from $\frac{3}{8}$ to $\frac{1}{2}$ inch (Fig 102 5 6) The tendon is replaced into its sheath and the sheath sutured with fine catgut If the smooth articular surface of the phalanx is normal and has not been injured in the course of the operation it is not necessary to interpose a flap of fat and fascia If the articular surface above mentioned has been disturbed a fascia flap may easily be taken from underneath This I did in one of my early cases and obtained a very good result The operation having thus been completed the capsule of the joint is closed and the skin closed with horsehair By this operation the great toe is shortened by means of the removal of the head of the metatarsal bone This is of no consequence at all

Fig 102

a a division of tendons when operation is complete and before extensor tendon has been replaced within its sheath

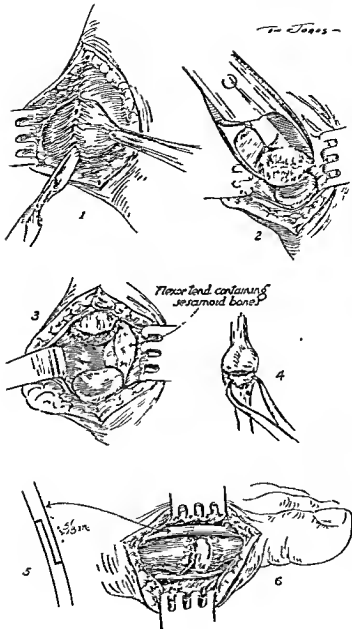To Jones

Flexor tend containing
sesamoid bone

Fig 102.
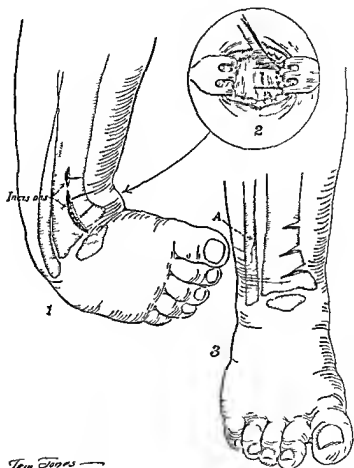
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A CASE OF BOW LEGS TREATED BY OPEN OPERATION

Summary Child three years of age presenting extreme bilateral rachitic deformity of tibia and fibula correction by multiple incisions on concave s de of deformed tibia and manual straightening without production of complete fracture

THIS patient is a female aged three years, with the signs and symptoms of a clearly developed case of rickets Previous ill nesses are negative This child was placed under treatment for a number of months at the end of which time an operation for the correction of the terrific deformity (Fig 103 1) was undertaken It will be noted that there is very little curvature of the upper end of the tibia There is scarcely any in the femur Inward curvature over the lower third of each tibia is so great that the lower articular surfaces point toward each other This child walks with great difficulty and places all of its weight on the outer aspect of the foot and ankle I believed it impossible to correct this deformity by mere fracture of the bone and I believed it quite improbable that a good result could be obtained by a single transverse cut in the tibia as is so frequently practised I wish in this case to make three or four transverse cuts in the lower end of the tibia sufficiently deep so that I will be able to straighten the tibia forcibly without making a complete fracture I shall not disturb the fibula at all I am making the incision over the lower end of the tibia and if necessary will make a smaller one higher up This incision you see is not over 1½ inches long (Fig 103 1) I have now exposed the bone and with the artist s chisel I am making my transverse cuts through the bone I am not taking

by grasping, the foot by the right hand and with the left hand grasping the shaft of the tibia having placed both thumbs over the outer aspect of lower end of the tibia, I can easily straighten it as you can see (Fig 103 3) I will do the same operation on
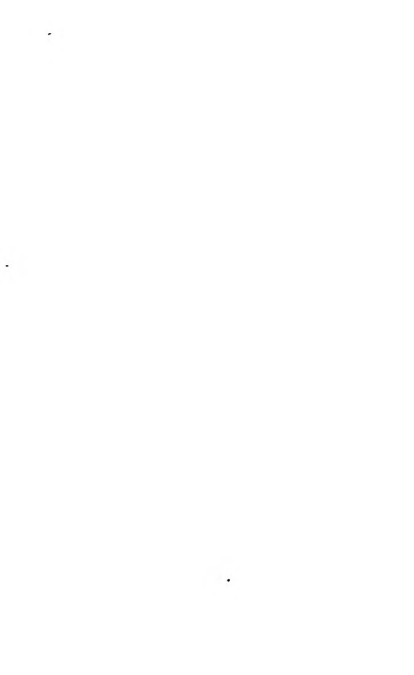
I wish to emphasize that this operation must be done without hand contact and as aseptically as for an arthroplasty of any of the larger joints The entire foot and space between the toes must be carefully prepared and sterilized the day before the operation, and covered with a sterile dressing Immediately before the operation the skin is again carefully treated with alcohol and ether, paying special attention to that portion between the toes A covering of gutta percha solution, which is a 1 per cent gutta percha in acetone, is then applied over the entire foot I make it a point always to treat the toe-nails and space underneath the tip of the nails with pure tincture of iodin I have seen several very severe infections following this operation where the operator was careless in his preparation and indifferent in his operative technic After the operation is completed a sterile dressing is applied and a wedge of sterilized felt or cotton is placed between the first and second and third toes and the whole wrapped in a dressing of gauze and cotton without any further immobilization Active and passive motion is started on the tenth day after the stitches have been removed

the opposite leg   By making this type of cut in the bone I will get but a small elongated wedge at the inner portion of the bone These gaps will fill up very much more quickly than if I had made but one transverse cut   You see that now the articulation points downward in a line with the straightened shaft of the tibia and that the foot can be placed on a flat object which is at right angles to the line of the shaft of the bone   I will now close the skin with horsehair and apply a sterile dressing   A cast will be applied extending from the base of the toes to the groin, and this one or a similar one will be kept on for at least four months   During this time the patient will be kept on a proper diet and medication of cod liver oil and phosphorus

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Tom Jones

the opposite leg   By making this type of cut in the bone I will get but a small elongated wedge at the inner portion of the bone These gaps will fill up very much more quickly than if I had made but one transverse cut   You see that now the articulation points downward in a line with the straightened shaft of the tibia and that the foot can be placed on a flat object which is at right angles to the line of the shaft of the bone   I will now close the skin with horsehair and apply a sterile dressing   A cast will be applied extending from the base of the toes to the groin, and this one or a similar one will be kept on for at least four months   During this time the patient will be kept on a proper diet and medication of cod liver oil and phosphorus

CLINIC OF DR WILLIAM M HARSHA

St Luke's Hospital

(Given at the Surgical Congress of North America October 24 1917)

DEMONSTRATION OF CASES

Summary Case I Absolute pyloric obstruction with complete ptosis of stomach posterior gastro-enterostomy recurrence of ptosis and obstruction after operation relieved by elevating foot of bed result after three months

Case II Aberrant thyroids—usual locations methods of approach to base of tongue

Case III Separation of lower epiphysis of femur—fixation obtained by nailing result after three years

Case IV Gonococcal arthritis—management

Case V Kondoleon operation for lymphedema—pathology of non filarial lymphedema—result after two years

CASE I --This patient, a woman about forty years of age came to the hospital last July with the diagnosis of gall bladder trouble At that time she weighed but 97 pounds and had not been able to retain a mouthful of food for three weeks x Ray plates showed a complete ptosis—the stomach was down in the pelvis Not a particle of bismuth had passed through the pylorus in nine hours The woman was cyanotic with a temperature below normal and was the most emaciated patient that I have seen in a long time The Ewald test meal showed a normal acidity and no evidence of malignancy Neither did the x ray pictures suggest malignancy The gastric shadows were smooth in contour In short there was nothing except the obstruction The diagnosis was pyloric stenosis probably the result of chronic ulcer

The patient was operated on There was a puckered scar completely closing the pylorus—apparently the result of a chronic gastric ulcer The stomach was found in the pelvis We drew

it up into its usual position and did a posterior gastro-enterostomy with no loop

Twenty four hours after operation she suddenly developed complete obstruction. The chief point of interest in the case is that she did well for the first twenty four hours and then developed the obstruction. On examination it was found that the stomach had dropped back into the pelvis. I was reluctant to reopen the abdomen and so put the patient in the Trendelenburg position to see if that would have any effect on the condition. The symptoms of obstruction immediately disappeared. This simply serves to show the mechanical influence of posture. If we had put the patient in the ordinary semi Fowler position or let her lie flat we would have accomplished anything without reopening. By putting her in the Trendelenburg position the stomach was forced back into its normal position and the obstruction disappeared. She then went along in the normal way. The operation was performed the 11th of last July and today she weighs 150 pounds.

CASE II—A woman thirty nine years of age unmarried. Nine years ago she had some kind of a growth develop on the base of her tongue just in front of the epiglottis. It developed to the size of half an English walnut and increased gradually for six months to the point of interference with deglutition and speech. She began to suffer severely from malnutrition. The tumor was too far back to get at through the mouth. We did a tracheotomy here (indicating) and gave the anesthetic through that opening. Then we made a Kocher incision and drew the tongue out under the chin. By prying the mouth open we could get access to the tumor. It was an aberrant thyroid as shown by sections. We could not do a typical operation but she made a very good recovery and has had no trouble since. You can feel a little tumor there yet, but it does not interfere in any way. It is eight years since the operation. There were bony elements in the growth. Parathyroids have been found in some of these cases as reported by others.

You are familiar with the different forms of aberrant thyroid. The most frequent form is found in the chest. They go

down behind the sternum more frequently than they go upward
One case I had was enlarged to the extent that cyanosis occurred
when the patient relaxed in sleep   A tracheotomy was done to
save the life of the patient on one occasion but the tube we
ordinarily use for tracheotomy was not long enough so we used
a glass tube long enough to reach the trachea past the obstruc
tion and that was enough to give him temporary relief and
enable him to take the anesthetic for radical operation   He
made a good recovery after removal of the gland   In a case
which I saw but did not operate on there was a growth beneath
the tongue elevating the tongue   It gave the appearance of ma
lignancy but was found to be an aberrant thyroid

CASE III — This patient is presented in order to show you the
result of a nailing of the epiphysis of the lower end of the
femur   The patient collided with a street car about three years
ago when he was seventeen years of age   He had concussion of
the brain with a base fissure a Colles fracture of one wrist, a
fracture at the middle of the left femur, and an epiphyseal sepa
ration of the lower end of the right femur   When he was taken
to the hospital nothing was done except to try to save his life
The fractures were neglected entirely   I saw him one month
after the injury   The separation at the lower end of the femur
was the important thing   The other fractures were easily handled

At operation it was found that the lower fragment was displaced
forward at right angles to the shaft   The ligaments and muscles
were retracted   After nailing the end to the shaft these cut liga
ments and the patellar tendon were too short to approximate   They
were spliced by fascia from in front of the upper end of the tibia
The joint is not as strong as the other knee, but it was a choice
of length or strength   The other thigh was shortened over ½ inch
by the fracture but has since grown until it is ¾ to 1 inch longer
than the one operated on because of the cessation of growth at
the operated epiphysis

You will notice the nails are driven in in such a way as not to
impinge on the articular ends of the bone   They have been
in for three years and are causing no trouble (Figs 104 105)   The
only compromise of motion is that of flexion   He cannot quite

bend the knee to the normal extent but he can get it straight
and has good functional use of the leg

CASE IV —Here is a young man twenty three years old who
entered the hospital today He had a Neisserian infection about
the 10th of May—about five months ago On June 2d that is

Figs. 104 and 10 —a Ray photographs (an anteroposterior and lateral views of a
case of separation of the lower epiphysis of the femur taken three years and a half
after fixation by nail No evenis to position with no evidence of inflammation
about them.

after an interval of three weeks which is about the usual time
as Dr Murphy used to say for Neisserian infections to metasta ize he had an infection in his left shoulder which subsided
in two or three days to be followed by a more severe infection
in the right hip From June 5th to the present time he has had

some disability in the left hip. He has now no leukocytosis, no evidence of secondary infection no fever, but this plate shows some degree of bone destruction (Fig 106). Some ankylosis is present as shown by the marked loss of motility at the joint.

The question in this kind of a case where there is no mixed infection but with some destruction of bone is What is the best

Fig 106.—x Ray photograph showing almost complete destruction of femoral head with beginning bony ankylosis as the result of a gonococcus arthritis of six months duration

method of treatment? It is now four months since the onset. It is barely possible that he may get along without complete ankylosis by using extension or by having adhesions broken up under an anesthetic later. I am reminded of a case I saw some years ago in which there was an infection of the same type of both knees. Both of them filled up very full of fluid. We aspirated one joint and

bend the knee to the normal extent, but he can get it straight
and has good functional use of the leg

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as Dr Murphy used to say for Neisserian infections to metas-
tasize he had an infection in his left shoulder which subsided
in two or three days to be followed by a more severe infection
in the right hip From June 5th to the present time he has had

beginning on the leg vaccinated and extending in patches—not continuously—over the lower abdomen and down the right thigh

Fig. 10.—X Ray photograph taken three years after subtrochanteric osteotomy of the femur and fixation in abduction to correct the flexion adduction deformity in a case of multiple bony ankylosis of the hip the result of gonococcus arthritis

This process lasted several weeks attended by temperature of 103.4 F Suppuration occurred in one place—streptococci were found in the pus The limbs began to enlarge soon after and continued to increase in size with her growth and development

let the other absorb by the usual method of treatment The result was that in the joint I aspirated the patient got some degree of fibrous ankylosis while in the one I did not aspirate he had a good joint It seems to me that if the fluid is withdrawn from such joints gradually there is less danger of adhesions between the joint surfaces At present we try to get along without any operative procedure except to wash out and disinfect the joint in the early stage It is not very often that we have just the hip involved in a single joint infection due to the gonococcus It is about the fifth or sixth in the order of frequency the wrist fingers shoulder and elbow coming first

The doctor asks me if the patient has shown any sign of heart trouble There has not been any The process began in the left shoulder left it suddenly without leaving any permanent disability and went to the hip where it has remained to the present time Gonococcus endocarditis is relatively rare

I am reminded of another case I had with twice as much destruction and shortening in a young man of the same age and from the same cause I did not see him until the hip was too far ankylosed in adduction to be able to do anything for him in the way of saving the hip Dr Ridlon saw the case with me and there was so much destruction that it was thought best to do a subtrochanteric o teotomy that is to go in and chisel the bone through sufficiently to permit it to be fractured and then dress the limb in abduction That was done and now he has very good function of the limb even with the hip ankylosed (Fig 107)

In this case we shall keep up extension until the flexion and adduction deformity is overcome and the joint surfaces separated The entire limb will then be put in a plaster cast in abduction We expect a good result

CASE V—A W aged twenty three   Family history negative   Personal History—Had the usual diseases of childhood Was vaccinated against smallpox three times before the age of nine always on the leg with negative result The last time the patient being then about nine years old she was vaccinated on the left leg There was no apparent result but in one month there developed a lymphangitis almost of the erysipelas type

CONTRIBUTION OF ROY L. MOODIE Ph D

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PATHOLOGIC LESIONS AMONG EXTINCT ANIMALS A STUDY OF THE EVIDENCES OF DISEASE MILLIONS OF YEARS AGO

Summary Evidences of diseases among ancient man and fossil animals known as paleopathology Disease unknown for the first three-quarters of the history of life on earth Fracture and callus among fossil vertebrates The nature of callus 20 000 000 years ago Necrosis and hypertrophy exostoses and their causes among extinct animals Bacteriology of the past Bacteria among the oldest evidences of life 100 000 000 years old Bacterial invasion of bone Bacterial decay fungi and their evidences Deforming arthritides of fossil vertebrates similar to recent arthritic lesions Osteoma from a swimming reptile 16 000 000 years old Hemangioma in the tail of a dinosaur 18 000 000 years old The pathology of cave mammals the first to be studied Bone pathology of early human races No evidences of syphilis among extinct animals Extinct diseases and cases among some of the vertebrates Paleopathology just beginning to be understood Study of fossil lesions does not change present concept on of the nature of disease

Within the last few years the science of paleopathology has received considerable impetus from the studies of Ruffer Elliot Smith Hrdlička and others on the *pathologic anatomy of ancient races of man* Evidences of disease antedating the advent of man many millions of years are also known and have been partially studied It is these latter conditions which shall receive our attention in this place

The age of these lesions is very great and must be measured by geologic standards it being quite difficult to measure in terms of years the age of these ancient evidences of traumatism If measured in terms of years the age must be measured not by decades nor by millenniums but by millions and tens of millions of years While all writers on the age of the earth do not agree

Twice there have been relapses or recrudescences with suppuration at one or two places

These relapses have not been caused by any recognized injury Apparently there has been a blocking of the superficial lymph trunks greater in the left leg than in the right as the result of these repeated attacks of streptococcus erysipelatous lymphangitis

When she came to the hospital the left leg at the calf measured 30 inches around After elevation and the application of a compression bandage the circumference was reduced about 3 inches

In May 1915 we did a Kondoleon operation The limb was elevated and an Esmarch constrictor applied Then an incision was made on each side from the knee to the malleoli through which the skin with a small layer of fat was undermined almost completely encircling the leg The fat and boggy connective tissue was then dissected off down to the deep fascia covering the muscles This deep fascia was removed in strips 1 inch in width leaving a space of 1 inch or more between the neighboring denudations The deep fascia is a barrier between the superficial and deep lymphatics the only anastomosis being through the lymph nodes Stripping off parts of the deep fascia permits direct anastomosis and hence drainage in case the superficial lymphatics as in the present instance become obstructed

The healing was slow and not entirely free from infection which was of the same type as the original in respect to its bacteriology The limb as you see is nearly or quite of normal size but not entirely symmetric This is probably due in part to uneven dissection but it is also due to a recrudescence—lymphangitis with suppuration—which occurred in the spring of 1917

The disability she formerly had has been removed by the operation and she can walk as well as the average girl and with the modern sky scraper shoes and short skirts makes an average appearance

of all of the fractures known among fossil vertebrates of pre tertiary age The rib portion is shown in Fig 108 A micro scopic section of this fracture shows many interesting things as can be seen in Fig 109 The section was made by well known petrographic methods and may be made thin enough for oil immersion study

The callus was quite evidently an old one for the fracture was completely healed The microscopic section shows many evidences of an old callus such as we are familiar with today Osteosclerosis and osteohypertrophy may be mentioned as two of these indications The region in the lower part of the figure I
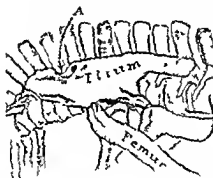

Fig 110 I b s of Camptosaurus a large dinosaur show ng a necrot c < nus at t n the poster or end of the r ght il um

have interpreted as an osteosclerotic area basing my conclusions on the absence of osseous trabeculae and the presence of a heavy deposit of calcium salts or other inorganic substance The white band running from right to left through the figure may be interpreted as a spicule of bone due to the splitting of the rib Its bony nature is definitely established by the presence of lacunæ in I Its presence is interpreted as an ingrowth of bony material into the cleft due to the splitting of the rib The hypertrophied area may be observed in the upper right hand portion of the figure an I is interpreted on the basis of the presence of numerous < eous trabeculæ There is no evidence that the fracture was infected necrotic sinuses being entirely wanting

on the number of millions of years, they all agree that the history of life on earth has occupied many millions of years A safe estimate of about 100 000 000 years may be made for the period

Fig 108—Portion of fractured rib of a Permian reptile

of time during which life has existed on the earth For the last one-quarter of this time or 25 000 000 years diseases are known to have occurred

Fig 109 —Microscopic section of above fracture and callus × 00

One of the oldest known indications of traumatism is a case of a fractured rib of a primitive reptile from the Permian of Texas, to which an age of 20 000 000 years may be assigned The lesion is a simple *fracture with some callus and is typical*

how the injury may have been received   Abel has suggested that
the specimen represents a female and the injury was received
during the breeding season

Other traumatic conditions are known among the dinosaurs
and will be described elsewhere   One of the most interesting is
that of an exostosis on the visceral surface of a scapula of Tri
ceratops one of the large three horned dinosaurs from the Upper
Cretaceous of Wyoming   The inner surface on which the hook
like process appears should be perfectly smooth since the visceral
surface slides over the ribs   This exostosis (Fig 111 a) must
have produced considerable laceration of the pleura   The lesion
was possibly due to some sort of chronic irritation or perhaps
pulmonary infection   A lesion of very similar form is commonly
seen on human bones and one is figured herewith on a modern
human femur for comparison (Fig 111 b)

Another interesting example of necrosis is seen in one of the
arm bones of a mosasaur shown in Fig 112 a   The mosasaurs
were large swimming reptiles and are found abundantly fossilized
in the Cretaceous deposits of Kansas   The necrotic sinus may
be seen at the upper pole of the figure   It is a deep irregular
rough sided pocket surrounded by a lipped surface indicating
the presence of an extensive suppuration   The accompanying
hypertrophy and the nature of the sinus are shown in Fig 112 b
which is a drawing of a sawn sagittal section of the bone   A
diagnosis of tuberculous necrosis has been suggested by a French
author as the cause of a similar lesion found among fossil mam
mals   Such a diagnosis in this case is wholly worthless   All we
are justified in saying is that the lesion presents all of the as
pects of a suppurative necrosis suggesting the abundant presence
of bacteria of a pathogenic nature

Bacteria are among the oldest known evidences of life and
are found associated with pre Cambrian algae in Montana   A
photograph of some of the proterozoic bacteria is published
herewith (Fig 113)   They are so readily comparable with
modern forms of bacteria that little need be said about them
These bacteria were discovered by Doctor C D Walcott in his
studies of the pre Cambrian formations of North America on

An interesting case of traumatic necrosis is seen in the ilium of a large dinosaur, as shown in Fig 110 The skeleton of this interesting reptile is mounted in the United States National
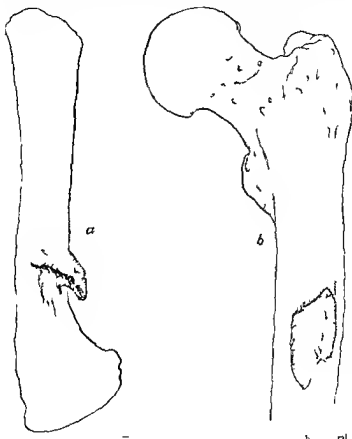
Museum at Washington The injury is on the posterior end of the right ilium and has resulted in a deep necrotic sinus ac companied by considerable hypertrophy of the bone as is commonly the case today in necroses It is useless to speculate as to

algæ the bacteria herewith pictured occur The cell walls of the algæ may be seen in the long broad parallel lines running across the figure The bacteria were possibly not pathogenic but are supposed rather to have been active in the deposition of calcium salts and the limestones in which the bacteria and algæ occur are supposed to have been deposited by their action upon the sea water This action by algæ and bacteria of a

Fig 113 —Fossil bacteria designated as m crococcus sho n magnified 1100 d ameters The e a

sho n in the figure

the bacter a occur

age of approx mat ly 1 w 100 000 years ma be ass gned to them

similar nature is a well established fact today We can only read the history of the past on the basis of what we know of present events

Since the pre Cambrian our knowledge of the occurrence of bacteria fungi an l other disease producing organisms is a blank until we come to the great Coal Period many millions of years later In this period are found abundant remains of bacteria
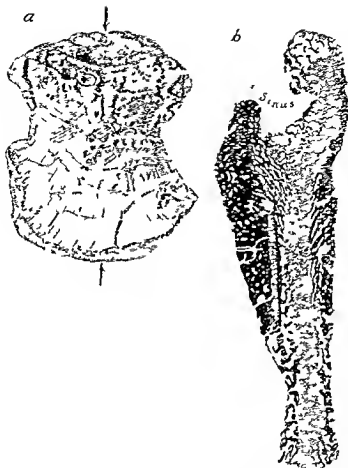
Fig 112—*a* Arm bone radius of a swimming reptile from the Cretaceous of Kansas showing roughened area necrotic sinus and hypertrophy The necrosis was possibly due to bacterial activity *b* sawn sagittal section of same bone taken in plane shown by arrows in *a* The sinus is seen to be an irregular cavity and immediately below this occurs an area of hypertrophied bone evident in the blackened portion of the drawing These areas are wanting in the small vascular spaces which are so abundant in the shaft of the normal bone

which he has spent many years The deposit in which the bone fragment occur has many impressions of algæ In the cells of these

on or near the articular ventral surface of a dorsal vertebra of
a mosasaur one of the large swimming reptiles of the Cretaceous
of Kansas Many of these reptiles attained a length of 30 to 40
feet and some of them were over 50 feet The animal to which
the vertebræ herewith described belonged was about 25 feet in
length These reptiles are among the best known of the fossil
vertebrates and their skeletal remains are widely distributed
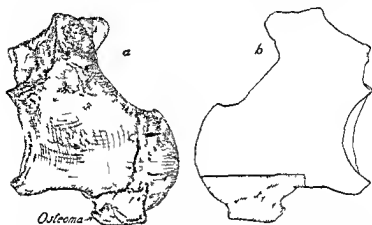in the geologic museums of the world The bone tumor is an

Osteoma

Fig 114—*a* Lateral view of vertebra of a mosasaur a swimming reptile from
the Cretaceous of Kansas being the only known fossil osteoma The vertebræ
of these animals were of the ball-and-socket type the so-called procoelous *b*
diagram of a sawn sagittal section of the vertebra showing in the shaded area the
region on drawing enlarged in Fig 115

outgrowth of the bone as may be seen in the sawn section
shown in Fig 115

The osteoma for such it may readily be called does not in-
volve a great deal of the intervertebral surface but has over-
lapped the junction of the two vertebræ and by adhesion has
formed a weak ankylosis The greater part of the osteoma how-
ever lies on the posterior end of one of the vertebræ and the
arthritic lesion takes the form of a cup shaped projection re-
sembling the lesions seen in spondylitis deformans The lesion
is determined by a sawn section attained a thickness of 10 mm

and fungi These organisms are probably largely the organisms of decay and we are ignorant as to what diseases they may have produced The bacteria are well known and have been described by several writers The organisms are found preserved in coal decayed wood petrified feces of fishes and other places In the petrified feces of fishes which are well known objects to paleontologists and to which they have assigned the name of coprolite the bacteria are especially abundant as we would naturally expect We are even able to arrive at some fairly good conception of the bacterial flora of the colon of these animals

In pieces of bone from the fishes Renault has been enabled to work out the stages in the destruction of the lacunae of the bone In the nearly normal bone the bacteria macrococci are seen to be invading the canaliculi and later stages are shown until the complete destruction of the bone is accomplished Cultures of the bacteria frequently occur petrified in silicon and an example of such a culture is shown in excellent photomicrographs by Renault Mucoid capsules which are so difficult to demonstrate today are occasionally preserved in plant cells of the softer vascular plants of the coal period

Fungi of many types are known and the fermentation of substances and the liberation of butyric acids by these plants is well established Many of these early fungi were spore bearing and the mycelia are often seen to bear sporangia resembling in all essential respects the spore bearing fungi of today Later in the geologic history of the earth leaf spot fungi were introduced and have become very well known

Deforming arthritides of many types are well known among fossil vertebrates but their dependence on any one form of traumatism is of course not established Probably as many causes operated in the past to produce arthritic lesions as are in operation today Among this large class of arthritides two will be mentioned here One of them is a hemangioma (?) and the other is an osteoma These lesions establish the presence of tumors in very early geologic periods Osteosarcomata are so far unknown

The osteoma to be described herewith (Fig 114 a) occurs

and a length of 25 mm On the right side of the bone the lesion is relatively smooth with lines of growth running circularly around the body of the mass interrupted anteriorly by an invading mass of rougher bone The portion of the right side is quite roughened and raised into a series of irregular ridges The osteoma is sharply marked off from the body of the vertebra as may be seen in the sawn section The osteoma has produced considerable disturbance near the posterior end of the vertebra
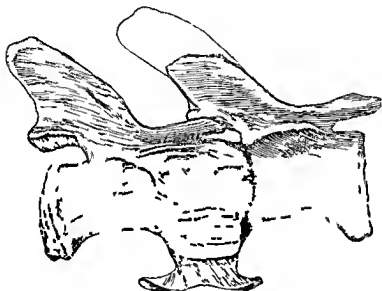
Fig 116 —Hemangioma between the two caudal vertebræ of a giant dinosaur from the Coman h an of Wyoming The les on has n olved all of the articular surfaces of the two bones

to which it is attached and is doubtless an outgrowth from the bone at this place After the excrescence had attained considerable dimens ons it began to grow anteriorly under the longitudinal vertebral l gament and merely rested on the bone as may be seen by referring to Fig 115 A microscop c study of this lesion has not yet been made The portion represented in the sawn section (Fig 115) is indicated in Fig 114 b by the shaded area

Fig. 115 Magnified drawing (× 9) of the shaded area shown in Fig. 114 f. The osteoma which lies at the top in the drawing is seen 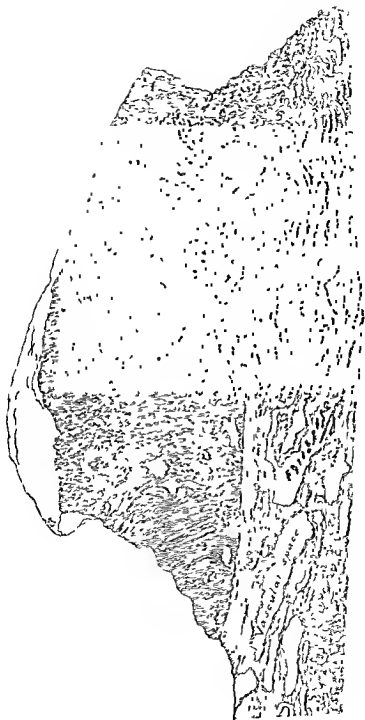to grow out of the body of the zeriebra, and grows backward along the bone. The line of demarcation is clearly evident.

Caries, alveolar abscesses, fractures, arthritis deformans spondylitis deformans, and other diseases are known to have afflicted early man

Many of the modern diseases which afflict the bones, such as syphilis and tuberculosis, are utterly unknown among fossil animals, since their diagnosis cannot be established on the evidence which is at present available We have advanced no further into the geologic history of syphilis than was attained when Virchow wrote his paper in 1896 on the "History of Syphilis," in which he called attention to the lesions of the 'Höhlengicht' of the cave bears Syphilis has been suggested as the cause of certain lesions of the remains of early man from Chellean of France but this statement is unsupported We may say at present that there is no geologic evidence of the presence of syphilis prior to 500 000 years ago Doctor Pusey has given sufficient subsequent data to establish all we know about the rise and spread of this dread disease

Doubtless many of the lesions seen among fossil animals are the lesions produced by an extinct disease It seems logical that some of the diseases which afflicted ancient animals became extinct with the group which were afflicted The influence which disease has exerted in the extinction of various groups of animals is of doubtful importance We are at least safe in asserting that the diseases which afflict the hard parts of animals have not been sufficiently important in the past to produce wide spread extinction

The science of paleopathology is yet quite young We are only beginning a study of the lesions of ancient times The importance of such a study in the interpretation of modern diseases is undoubtedly great We may even discover something in regard to the nature of disease One of the very early indications of disease in geologic time is caused by parasitism and it may be possible that many of the diseases of ancient times had a parasitic nature This is not yet established The chief results of the study of paleopathology to date are to call attention to diseases many millions of years old which so far as we can see, differ but slightly from the lesions of modern diseases

The other arthritic lesion shown (Fig 116) is from the ver
tebral column of a dinosaur, *Diplodocus*, from the famous Como
beds of Wyoming, to which an age of 18 000 000 years may be
assigned   A larger and similar lesion, described elsewhere,
seems to be a hemangioma, or it may be a callus due to fracture
of the tail, or osteomyelitis or some other infective process   At
any rate it is a type of lesion which is not uncommon in the
dinosaurs   These gigantic reptiles, with a length of nearly 70
feet and a weight of approximately 40 tons, dragged their tails
along on the ground for a length of nearly 30 feet. The ter
minal vertebrae were reduced to mere slender rods of bone and
were easily subject to traumatism   The real nature of the
lesion is not established   but there is no evidence of infective
processes   The union of the two vertebrae is a solid one   a true
ankylosis

The above-described lesions are known on the bones of
ancient vertebrates   More recent lesions are known on the
remains of Pleistocene vertebrates   Pathologic conditions were
first recognized and described among the Pleistocene mammals
especially the cave animals of Europe   Rudolph Virchow in
itiated the study of these lesions in 1875 by the discussion of a
case of spondylitis deformans in the vertebrae of a cave bear from
Bavaria   The deposits in the caves were the first to be explored
by paleontologists, but the remains found in the caves were for
a long time thought to be relics of the universal flood which,
according to Hebrew tradition   had destroyed all animal life.
Buckland, Dean of Oxford defended this idea in his Reliquæ
Diluvianæ, and his descriptions and interpretations of the bones
are based on this assumption

Many traumatic conditions are found among these ancient
bones   Fractures caries absorptive processes similar to pyor
rhea alveolaris, necroses, arthritic lesions, often resulting in the
complete ankylosis of several vertebrae, osteoperiostitis, and other
afflictions are known on the remains of Pleistocene vertebrates

Associated with the remains of Pleistocene man   often
occur the bones of primitive man   Early man was subject to
the same traumatic influences as were the early cave mammals

CLINIC OF DR H M RICHTER

COOK COUNTY HOSPITAL

HEAD INJURIES: DEMONSTRATION OF 2 CASES

Summary Patients presenting (a) compound, comminuted, depressed skull fracture, (b) cerebral contusion, involving cortical arm center, operations—immediate exploration of all scalp wounds for purposes of diagnosis and treatment essential—fallacy of delaying for the x ray picture, general summary of management of scalp wounds made by blunt force

December 11, 1917

WE have today two head injury cases   The first man was brought to the Cook County Hospital on November 29, 1917, with a small scalp wound in the right side of his forehead, toward the parietal region   Sutures had been placed before the man entered the hospital   As the patient showed no untoward symptoms he was regarded as having but a minor injury and so was sent to his ward, and the next morning was x rayed   Owing to the volume of radiographic work done here, the x ray report did not reach the intern until forty-eight hours after the man entered the hospital   When the x ray plate was finally examined, it was found that the patient had a depressed skull fracture underlying his scalp wound

The second patient came into the hospital forty-eight hours ago, with an abrasion of his forehead   He was sent directly to the observation ward, where it was found that he had paresis of his right arm   Because of his lack of knowledge of English and the difficulty of securing an interpreter the history is quite wanting   We do not know whether the paresis was present from the time of injury or developed later   We do not know, moreover, whether the patient was unconscious for any length of time   It is believed, however, that the paresis came on some hours after the injury was received, and in discussing the diagnosis of the brain lesion we shall take up the importance of this phase of the history

course the observation of the patient himself to determine
whether focal or other phenomena are manifested

The idea then is to determine immediately the patient s condi
tion in order that we may be guided in our treatment   We believe
it a mistake to permit a patient with a scalp injury to wait many
hours for an x ray examination   when his condition can be
determined at once   Where emergency x ray work can be done
and the results obtained at once   its use is of the greatest auxiliary
value

The further care of the patient will be determined then by the
nature of the skull fracture and the nature of the brain injury
The time of intervention should only be delayed when the nature
of the brain injury is such as to make it advisable

The first patient presenting a depressed skull fracture under
lying a scalp wound   was brought to the hospital soon after the
injury   He presented at that time a type of injury calling for
immediate treatment without awaiting x ray work   Our treat
ment here should have consisted of the immediate exploration
above described and the elevation of the fragments   If however
a skull fracture is accompanied by evidence of profound shock or
of extensive cerebral laceration it is far more important to take
cognizance of the patient s general condition and avoid immediate
operation as one would avoid such an operation in the shock
accompanying an extensive crushing injury of the thigh

In the patient before us with a skull fracture first discovered
at the end of three or four days from the time he was injured it
was felt unsafe to interfere for the purpose of raising the depressed
fragments until complete wound healing had occurred since the
scalp wound sutured before the patient came to the hospital was
apparently not aseptic   Today however the wound is clean and
we shall proceed to operate

In the second patient the history of the time of onset of his
paresis is unfortunately lacking   He has an abrasion on the left
side of his forehead and his left arm shows some degree of paresis
which has not varied in the last forty-eight hours   Since it
appears that the paresis came on some hours after injury we
think it likely that it must be due to hemorrhage and since the

I wish to call your attention to the fact that both of these patients were under observation for a number of hours before a diagnosis was made and the course of treatment outlined—and I do this with the intention of presenting to you my idea of the proper course of treatment for all early skull injuries as opposed to the method represented in these two instances.

Every scalp wound made by a blunt force presupposes sufficient energy to damage not only the scalp but the underlying bone, and particularly the brain itself. Therefore no scalp wound of this character should be passed by for further study, but the immediate diagnosis should be arrived at as to the extent and nature of the injury.

The examination to determine this diagnosis should proceed as follows. The scalp should be prepared as if for skull operation, the wound immediately disinfected and the edges of the wound trimmed or excised. In other words, the soiled wound should be converted into a surgical wound. The depths of the wound should be thoroughly explored, and if periosteum remains intact over the bone, it should be incised and pushed back with a periosteotome, and the skull examined for fracture. This routine treatment gives immediate exact information as to the presence of an underlying skull fracture.

In the absence of such a fracture, the scalp should be sutured and closed without drainage, as if it were a clean hernia incision. This method of routine exploration of the skull in every scalp wound caused by blunt force was customary during my internship in this hospital twenty years ago. I believe it a most unfortunate development that the x-ray examination has been substituted for this perfect means of immediately establishing the local condition.

Only where the presence of a foreign body such as a shell fragment, may determine the line of procedure, should the x ray examination take precedence over direct examination, and here only when the x ray examination can be made at once.

The second step in the examination is the roentgenographic examination made to determine the presence of a fracture at a distance from the scalp wound.

Preliminary to these two steps in the patient's care is of

course the observation of the patient himself to determine whether focal or other phenomena are manifested

The idea then is to determine immediately the patient's condition in order that we may be guided in our treatment. We believe it a mistake to permit a patient with a scalp injury to wait many hours for an x ray examination when his condition can be determined at once. Where emergency x ray work can be done and the results obtained at once its use is of the greatest auxiliary value

The further care of the patient will be determined then by the nature of the skull fracture and the nature of the brain injury. The time of intervention should only be delayed when the nature of the brain injury is such as to make it advisable

The first patient presenting a depressed skull fracture underlying a scalp wound was brought to the hospital soon after the injury. He presented at that time a type of injury calling for immediate treatment without awaiting x ray work. Our treatment here should have consisted of the immediate exploration above described and the elevation of the fragments. If however a skull fracture is accompanied by evidence of profound shock or of extensive cerebral laceration it is far more important to take cognizance of the patient's general condition and avoid immediate operation as one would avoid such an operation in the shock accompanying an extensive crushing injury of the thigh

In the patient before us with a skull fracture first discovered at the end of three or four days from the time he was injured it was felt unsafe to interfere for the purpose of raising the depressed fragments until complete wound healing had occurred since the scalp wound sutured before the patient came to the hospital was apparently not aseptic. Today however the wound is clean and we shall proceed to operate

In the second patient the history of the time of onset of his paresis is unfortunately lacking. He has an abrasion on the left side of his forehead and his left arm shows some degree of paresis which has not varied in the last forty-eight hours. Since it appears that the paresis came on some hours after injury we think it likely that it must be due to hemorrhage and since the

cerebral lesion must be on the side of the head opposite to the abrasion it is also apparent that the lesion must be one of the type developed by contrecoup Injuries occur by contrecoup either in the bony skull the dura or the brain substance but it is obvious that the consistency of the brain substance renders it far more susceptible to this type of injury than either bone or dura A hemorrhage therefore occurring by contrecoup is most likely to be produced by cerebral laceration with injury to the cerebral vessels rather than to the meningeal artery Since the cortical area involved is apparently rather small we shall vary from the usual osteoplastic flap method and remove bone from beneath the temporal muscle as if we were doing an incomplete subtemporal decompression hoping to find in this way the hematoma with a minimum degree of operative traumatism We shall now operate upon these patients

In the first patient we turn down a flap of skin and subcutaneous tissues in such a way as to make the original scalp wound the center of our flap with the base of our flap directed toward the temporal region in order to secure for it a good blood supply We find the scar adherent to the fractured bone and separate it by sharp dissection A bony defect approximately 1½ inches in length by ½ inch in width becomes apparent Numerous small fragments present themselves rather fixed by exudate depressed and firmly wedged into place over part of the area The bone is grossly soiled—the dirt evidently ground into the tissues

The condition of wound healing I might say presents a remarkable evidence of nature's ability to care for soiling and prevent active infection from developing

With a chisel the edges of the depressed fragments are removed to permit the edge of the chisel to gain entrance The small fragments are then levered out of position It is found that in most of the fragments the plates are separated and the soiled outer plates are thrown away The clean fragments, particularly those of the inner plate are saved A fragment, upward of 1 inch in length and nearly ½ inch wide is found depressed at right angles to the skull It is easily levered back into position The

dura is found uninjured   A few of the small fragments of the inner plate are now replaced and the scalp sutured back into position without drainage

For the second patient we will make an incision practically the same as used by Cushing for subtemporal decompression

Fig 117—Osteoplastic flap turned down in a case representing a picture of gross cerebral injury similar to that found in Case 2   Shaded area contusion of brain substance represented by ecchymoses

It is carried down to the temporal fascia the flap turned downward the temporal fascia split and the upper thin bone opened with a Hudson drill   The drill proving to be dull a small trephine is substituted and a button of bone removed   The bone is then widely rongeured away mainly upward toward the lower end of the motor area and the dura opened (Fig 117)

The brain presents the appearance of extensive ecchymosis
with no hematoma to be found   Hemorrhage from a pial vessel
that gives considerable annoyance is instantly controlled by
placing a shred of temporal muscle upon it and making pressure
The lesion consists in cerebral laceration involving the arm area
rather than a hemorrhage and the opening is therefore closed
without drainage and without further exploration   (A further
history of this case obtained after operation made it probable
that the paresis was existent from the time of injury   This
history is strongly suggestive of cerebral laceration rather than
hemorrhage and is in accordance with the ecchymosis found at
operation   Both patients made a normal recovery from opera
tion the patient with the depressed skull fracture being at work
within a few weeks of the time of operation   The second patient
showed a little additional paresis of the arm immediately following
his operation from which however recovery began to manifest
itself and improvement advanced beyond the original degree of
paresis during the ensuing week)

COMMENTS

Neither of these patients showed any evidence of increased
intracranial tension   The amount of damage to the brain in
neither case has resulted in any extensive hemorrhage or material
amount of secondary traumatic edema   There are no changes
in the pupillary reactions the fundi or the respective reflexes in
either case except as regards the paresis of the right arm in the
second one   There is no increase of tension of the cerebrospinal
fluid as manifested by spinal puncture or by altered pulse-rate
The cerebrospinal fluid in the first instance was very bloody
In the second instance it was blood tinged   The significance of
the presence or absence of blood in the cerebrospinal fluid in
cases of cranial injury is as follows

Extradural hemorrhage and hemorrhage into brain substance
not reaching the pial membranes or the ventricles does not appear
in the spinal fluid   Cerebrospinal fluid under these conditions
remains clear   Thus an extradural hemorrhage over the middle
meningeal artery is not accompanied by blood obtained by spinal

puncture   With fractures of the vault where the dura is not closely adherent to the bone, such an occurrence is frequent

In fractures of the base where the dura is intimately adherent to the bone, blood is constantly found in the spinal fluid, as it is in any instance in which blood can reach the meningeal spaces or the ventricles

SUMMARY

All scalp wounds made by blunt force must be regarded as possibly accompanied by skull fracture or brain injury, or both

Immediate examination for cerebral symptoms includes a study of the reflexes the eye-grounds the cerebrospinal fluid, and of the blood pressure

The scalp should immediately be prepared as for a cranial operation, the wound itself disinfected its edges excised and the underlying bone exposed and examined for fracture

No delay should be permitted for x ray examination unless the latter is immediately indicated

An exception to this latter rule is the possible presence of foreign bodies such as shell fragments the removal of which may be desirable

The recognition of a compound skull fracture should be followed by immediate operation—which consists in disinfecting the wounds elevating the fragments controlling hemorrhage and closing the wound without drainage

An exception to this procedure exists in those cases in which shock or excessive brain contusion renders the immediate further traumatism of operation exceptionally dangerous

It is particularly important that all wounds of a soiled or contused character be at once converted into clean surgical wounds by thorough excision and immediate closure without drainage

A delay of a number of hours for observation or x ray examination enables infection to develop in the soiled wound and prevents the immediate closure that is so desirable

The excision of an extensively contused scalp wound with considerable loss of tissue may make the approximation of the edges difficult but free incision at a distance from the wound with sliding of the flap, will obviate such difficulty in most in

stances and transpose the denuded area to a site distant from the
fracture

Shell fragment injuries to skull and brain should be treated by
immediate disinfection excision and closure, where the condition
of the patient permits

If his condition precludes immediate operation treatment
should be deferred until the patient has been transferred to a
base hospital

Disinfection and closure of the wound without removal of the
fragment should be carried out if the latter cannot readily be
found

Persistent coma without evidence of increased intracranial
tension does not constitute an indication for operation nor is it in
itself an indication of increased intracranial tension

Troublesome bleeding from a pial vessel will be controlled by
a shred of muscle pressed on the opening in the vessel

CLINIC OF DR JAMES HERBERT MITCHELL

Rush Medical College

(Department of Dermatology and Syphilis)

THE EXTRAGENITAL CHANCRE AS A COMPLICATION IN MINOR SURGERY

Summary Factors which cause delays in diagnosis the effects of local treatment and of the invasion of pus cocci importance of the demonstration of the spirochete as an aid to rapid diagnosis technic method of obtaining material for examination the dark field illumnator

FOURNIER the great French syphilologist who was accused by his contemporaries of seeing syphilis everywhere answered his critics by saying que l on ne songe jamais assez a la syphilis —we don t have it in mind frequently enough

This failure on the part of the physician to think of the possibility of syphilis when confronted by lesions on the hands or face which appear to be indolent pus infections of very low grade virulence results in many chancres going unrecognized until the disease his become generalized and much harm to the patient has been done Not only does the physician fail in many such cases to recognize the extragenital chancre in his patient but oftentimes a physician is met with who has failed to consider the possibility of syphilis in a lesion on his own hand This is especially true among physicians who have a good class of patients in the smaller communities Such men encounter syphilis so rarely among their patients that they are caught off their guard and become infected without suspecting it

One of the famous medical teachers of former days at Rush Medical College is still quoted to the effect that when examining a patient the examiner should put his finger into every hole he can find This is of course good advice considered from the

standpoint of thoroughness in examination but following out this advice is sometimes very hard on the fingers and particularly was this true in the days of the prerubber glove dark ages Many infections have resulted from palpation of mucous membrane lesions by the ungloved index finger and also from doing obstetric and gynecologic work without gloves But in some cases infections have occurred in spite of rubber gloves Either the rubber may become torn accidentally or, as in 2 cases (Fig 118), which I have seen in my work with Dr Oliver S Ormsby, the spirochete has found a portal of entry on the wrist above the line of the glove

Fig 118—Chancre developing near the top of the rubber glove on the wrist of a left handed physician

The lesion shown in Fig 118 occurred on the left wrist of a physician who enjoys a large practice in a wealthy community It began as a small papule and for some time was given no attention. It continued to enlarge however and became painful and was associated with lymphangitis and axillary lymphadenitis The physician then commenced to treat it as a pus infection with hot dressings and an attempt at drainage. The lesion not only showed no evidence of healing but gradually increased in size After about eight weeks he noticed a feeling of malaise anorexia, and loss of weight Joint pains developed and the

patient became so ill that he was scarcely able to carry on his practice Not until then did he begin to think of syphilis but even after going over his records he was unable to find any case in which he could recall any possibility of infection Later how ever he remembered having delivered a woman whose husband unknown to him at the time had syphilis When he presented himself for examination twelve weeks after the onset of the lesion he was found to have a generalized maculo papulo exanthem a positive Wassermann and numerous Spirochæta pallida in the chancre The disease was transmitted to the wife in whom it ran a similar course except that treatment was instituted much earlier and the Wassermann became negative in a much shorter time

This case serves to demonstrate the unfortunate sequelæ which attend the treatment of a chancre as a pus infection Had this physician presented himself for examination in the first week after the appearance of the papule the spirochetes could have been found intensive treatment administered the development of secondary manifestations and also the contamination of the wife could have been prevented

The other wrist case occurred just above the glove line on the right wrist in a physician who comes in contact with syphi lis quite frequently He has always been on his guard and per haps might be thought by some to be overcautious When the papules appeared on his wrist he did not believe it to be a chancre for the very reason that he had always taken elaborate precau tions to avoid contagion At first he thought it a pus infection and treated it as such It did not yield to hot dressings and in cision however and he began to think of blastomycosis and actinomycosis When finally he appeared for examination about six weeks after the onset he had decided that it must be anthrax Ten minutes sufficed to demonstrate spirochetes with the dark field and on the following day the Wassermann proved to be po sitive

Another interesting case occurred in a young surgical intern in one of the large hospitals The lesion began on the finger as a rather acute pus infection Lymphangitis developed and the

arm became swollen In spite of careful surgical treatment
with hot packs and free incision the lesion continued to enlarge
Finally the lesion was excised cultures were made and the tissue
examined histologically A number of highly skilled men agreed
that it was an obstinate pus infection No attempt however was
made to find the spirochete In due course of time secondary
manifestations of syphilis developed and the patient was put
upon treatment The association of pus organisms with the
spirochetes in the production of this lesion so marked its clinical

Fig 119—A chancre on the tip of the index finger of a nurse showing the soft
granulation tissue-like appearance

appearance that the surgeons who had the case in charge were
completely deceived It is fairly certain however that spiro-
chetes could have been demonstrated during the first week after
the onset

The clinical appearance of the chancre has been so frequently
described for so many years that almost every medical man has
memorized the description and if the appearance of the lesion
does not fit this description the possibility of its being syphilis
is sometimes dismissed There are many factors at work often

times, however, to interfere with the pathologic processes, and as a consequence the clinical appearance of the lesion is atypical Chief among these are (1) The location of the lesion, (2) the association of the pus cocci, (3) the treatment

If the lesion develops in a region where it is constantly traumatized, as on the tip of the finger (Fig 119), it may present an appearance which is quite different from that of a chancre on

Fig 120—Photograph showing a chancre on the eyebrow and submaxillary adenopathy on the same side

the eyebrow (Fig 120) where it could develop with relatively little interference Or if the infection take place on the lip particularly on the lower lip there is not only opportunity for constant trauma but maceration and secondary infection as well As a result the lip chancres are usually quite large, rather boggy, and exude a large amount of serosanguinolent fluid which dries into a thick crust This crust is torn away from time to time and a new one is built up

The effect of surgical treatment of a lesion on the finger is well shown in Fig 119 This primary formed on the index finger of a nurse who was actively engaged in her work. The combined action of having her hands frequently in water the manipulation by the patient in an attempt to evacuate pus and later the hot dressings and incising and trimming done by the attending physician so altered the appearance and the induration that without a search for spirochetes no one would have been able to make a positive diagnosis The lesion consisted of a rounded mass

Fig 121 – A chancre on the left index finger following contact with vaginal lesion.

was soft and readily oozed serous fluid The edges had been pared away under the supposition that the tissue was unhealthy granulations Spirochetes were unusually numerous and the Wassermann was already positive when the patient was first seen five or six weeks after the appearance of the primary papule

The history as given by the patient may lead the busy practitioner far astray even though there be no intention on the part of the patient to deceive him A good example of this is shown in the next case (Fig 121) This chancre appeared on the left

index finger of a young man employed in a large plant When he reported to the company physician he stated that he had pinched his finger in a door, a statement which was perfectly true The physician glanced at the finger and instructed the nurse to dress it daily The instructions were carried out, but inasmuch as the lesion had not healed after several weeks, the physician suspected syphilis and referred him to the writer

When I examined him he volunteered at once the information that he had had the lesion for four weeks and that it followed an abrasion resulting from catching the finger in a door The ulcer looked like a chancre, however, and without further delay serum was collected for examination After finding the spirochetes I returned to him and questioned him closely At first he stoutly denied that he had been exposed to infection but later he re called that while in a small town he had made the acquaintance of a girl at church on Sunday evening and that while in the hammock he had made a vaginal examination 'But that was a long time ago,' he said This 'long time ago' proved to be seven weeks, which was just right allowing three weeks for incubation and four weeks for the duration of the chancre

Occasionally one encounters a case in which the surgical treatment has taken the form of complete excision For many years there had been much discussion of the advisability of this procedure but gradually the practice became abandoned for the reason that no clinical benefit could be observed Recently this has again been advocated especially by Wile of the University of Michigan Excision of the chancre however, always presupposes simultaneous intensive, antisyphilitic treatment, and no one anticipates any clinical results from excision alone When an extragenital lesion is excised through a mistake in diagnosis, then great harm is done to the patient, because valuable time is lost The following description of a case serves well to illustrate this point

A young and vigorous married man, who was in one of the training camps for army officers developed a lesion on the abdomen near the umbilicus His civilian physician treated it for a time as a boil, but the lesion continued to enlarge Finally, he

made a complete and wide excision of the tissue, which be sent to a commercial laboratory for diagnosis In a lengthy report submitted by this laboratory, blastomycosis, tuberculosis anthrax and leprosy were excluded from the possibilities and by a process of elimination a definite diagnosis of an acute pus infection was made Syphilis, unfortunately, was not even considered—at least it was not mentioned in the report The wound healed without difficulty and left a scar 6 inches long About two months later the patient developed lenticular papules on the face and corymbose papules on the trunk His physician then began to treat him for acne vulgaris, mistaking the lenticular papules for ordinary acne Not until an interstitial keratitis and pharyngeal mucous patches incapacitated him for military duty was a diagnosis made by his medical officer, who recognized the nature of the disease at a glance He was referred to Dr Ormsby for treatment and later was discharged from the camp

If, in this case, an examination for spirochetes had been made in the first week after the onset of the trouble intensive treatment would have healed the lesion within five days the man would have been spared the discomfort of the secondary lesions he could have continued his military career and in all probability the Wassermann reaction would have become positive

Another interesting phase of the extragenital lesion is the development of a chancre as a direct result of a minor surgical operation We have now under treatment a woman who while sewing ran a needle into her hand She hastened to a nearby physician who was known to be a hard drinker and to be very careless about aseptic precautions The patient found him somewhat intoxicated but feeling that haste was imperative allowed him to probe for the needle with an instrument which was visibly contaminated At the point of probing a chancre developed

berma Several stitch abscesses occurred on the right side but all healed uneventfully One abscess, at the lower end of the

scar the last which had occurred had given the patient trouble
for some weeks but notwithstanding he did not return to the
surgeon for treatment   He finally fell into the hands of a phys
ician who recognized the chancre which had developed (Fig 122)
and who tried to persuade the boy that he had grounds for legal
action against the surgeon   The boy readily admitted when
questioned that while these stitch abscesses were still open
ulcers he had cohabited for a period of three weeks with a young

Fig 122   Chancre which developed in a stitch abscess of a herniotomy scar

woman who had warned him that she had syphilis and who had
cutaneous and mucous membrane lesions at the time he formed
the liaison

The significance of this group of extragenital chancres lies
in the fact that the extragenital lesion is very common—probably
at least 10 per cent of all cases—and that many cases are treated
as pus infections which instead should be examined immediately
for spirochetes   Any indurated papule which persists for more
than a week should excite suspicion on the part of the physician

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Another case which was the indirect result of a surgical operation was recently referred to us by an excellent surgeon who had operated upon a young man of nineteen for a bilateral inguinal hernia. Several stitch abscesses occurred on the right side but all healed uneventfully. One abscess at the lower end of the

scar the last which had occurred had given the patient trouble
for some weeks but notwithstanding he did not return to the
surgeon for treatment He finally fell into the hands of a phys
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than a week should excite suspicion on the part of the physician

After the lesion has developed to the point where it has become a crusted nodule with cartilaginous induration and marked regional adenopathy the diagnosis is readily made but by this time the patient has acquired a generalized distribution of spirochetes and the treatment has become correspondingly difficult The time to save the patient from all the unfortunate sequelæ of a Luetic infection is during the first week and the only way this can be accomplished is by making thorough and if necessary repeated examinations for spirochetes The Wassermann will be of no aid in the diagnosis at this time because it rarely becomes positive within less than three weeks after the beginning of the chancre

A point that is of the greatest importance in the treatment of a suspected chancre is the *avoidance of cauterization and the avoidance of the use of local mercurial applications* The reason for this is that no possible good can be done by such treatment alone if the lesion prove to be a chancre and furthermore the demonstration of the spirochetes is thereby rendered very difficult or impossible

The two important steps in the *demonstration of the spirochetes* are the collection of the serum and the setting up of the apparatus If the lesion be not more than a week old the serum which exudes from the surface should be drawn up in a Wright pipet which is nothing more than a glass tube drawn out to a point or the serum may be taken up on the point of a dull blade and then placed on a thoroughly clean slide Enough serum should be obtained so that when the cover slip is placed over it there will be no bubbles left If the lesion be more than a week old it is sometimes necessary to puncture the base of the indurated lesion with a very fine hypodermic needle and aspirate the serum by means of a Luer syringe which has an air tight plunger

After placing the serum slip over this drop of serum it is well to rim the cover slip with balsam or melted paraffin This procedure is for the purpose of holding the slip in place and of preventing infection of the operator

The light used should be the strongest possible and the best is a small arc light The dark field illuminator is nothing more than a microscope stage which has a large perforation and in

the center of which is a black disk. About this perforation is a beveled mirror Therefore no light comes up directly through the aperture in the stage but instead it strikes the beveled mirrors and is thrown directly across the microscopic field The result is a bright illumination of all the particles in the serum against a black background If the field be brightly lighted it means that too much light is entering through the objective In order to cut down this light it is then necessary to insert a conical condenser which fits in the Bausch & Lomb immersion
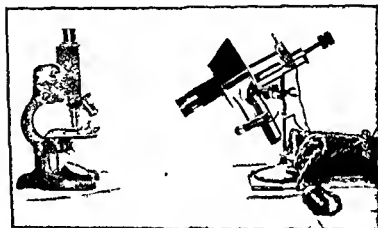

Fig 123   Apparatus in position for detection of Spirochaeta pallida   Note that the Abbé condenser has been swung aside

lens With a little skill and the proper apparatus (Fig 123) the demonstration of the spirochetes becomes a very simple piece of technic

In the absence of apparatus the physician in the small town may collect the serum himself in a Wright pipet seal the ends and send it to a laboratory which is properly equipped for making such examinations Transportation of the serum will result in loss of motility of the spirochetes but the morphology will be retained for a few days or even as long as a week in some cases

CLINIC OF DR THOMAS J WATKINS

St Luke's Hospital

PALPATION OF KIDNEYS: TECHNIC AND DIAGNOSTIC IMPORTANCE

This subject is discussed because my experience is that ability to palpate the kidneys has not been generally acquired by physicians. This opinion is based upon the literature and personal experience. Both kidneys are palpable in women in 95 per cent or more of cases. If one is not able to palpate the kidneys in some such percentage of cases, it is proof that his technic is deficient, or his sense of touch not sufficiently developed.

Technic.—The principle involved in the technic is much the same as has been developed in conjoined palpation of the uterus and ovaries. This palpation is so well understood that it probably needs no special discussion.

There are certain features that are highly important in obtaining desirable results. The muscles of the hands and arms should be in a relative state of relaxation, palpation should be done by light pressure, attention should be acutely centered upon the fingers. The sense of touch is much more acute with light than heavy pressure. This can be easily demonstrated by palpating very fine objects, such as needles, threads, and the like. Firm pressure also has the disadvantage of stimulating the muscles to contract and thus to increase the resistance to palpation.

I am informed that palpation is very much facilitated by placing the patient in a warm bath, but I have had no personal experience with this.

The hands are placed, as in palpating the uterus and ovaries, so that the organ is engaged between them. One hand is held quiet, while the other makes light vibratory motions. There is

no special choice as to whether the hand posterior to the kidney
or the one in front is held still   There may be slight advantage in
the hand anterior to the kidney making the vibratory motion.
The hand anteriorly should be shifted upward and downward so
as to obtain the lower boundary of the kidney   When this hand
is below the lower border of the kidney then no impulse is ob-
tained on the other hand   In cases of uncertainty as to impulse
this uncertainty can often be removed by comparing the sensa-
tions obtained when the anterior hand is over the usual location of
the kidney with the sensation obtained when this hand is placed a
good distance beyond the border of the kidney

Complications Which May be Encountered.—On the right
side a distended gall bladder may cause an error by its becoming
engaged with the kidney between the two hands   This can
usually be excluded by shifting the hand which is anterior and
with a large gall bladder one can generally get the impulse of the
kidney to the side of the enlarged gall bladder

Another complication which may interfere with examination
is a long lobe of the liver extending down over the usual location
of the kidney which is easily mistaken for a kidney and in some cases I believe can
only be excluded by auscultatory percussion. The question of
auscultatory percussion however will not be considered here as
it is aside from our subject.

The presence of tumors may also be misleading but tumors in
this region are so uncommon that they are not of great importance
On the left side the presence of an enlarged spleen may be mis-
taken for the left kidney   This however is not a common oc-
currence and can also be easily excluded by auscultatory per-
cussion. The presence of a neoplasm over the left kidney may
also cause an error but these are comparatively infrequent.

This means of palpation of the kidneys should enable one to

thickness of the abdominal wall In both instances, with a thickened abdominal wall, there is always a tendency to over estimate the size of the organ being palpated, and the reverse in cases of a very thin abdominal wall

The usual method of examining kidneys, by forcing them to slip between the fingers, is valuable, but it is too crude to be of much use, as in a majority of cases this is not obtainable, and is never obtainable on the left side unless the kidney is very much enlarged or greatly displaced

CLINIC OF DR PAUL OLIVER

COOK COUNTY HOSPITAL

A CASE OF HODGKIN'S DISEASE

Summary A patient presenting progressive right cervical lymphadenopathy of five months duration diagnosis of Hodgkin's disease—the differentiation of tuberculous lues chronic coccal lymphadenitis leukemia lymphosarcoma and metastatic carcinoma treatment

This patient a clerk thirty two years old enters the hospital because of a swelling on the right side of the neck

Five months ago he noticed a nodule about the size of a marble just below the angle of the jaw It was soft and painless and grew gradually Other nodules later began to develop in this region There has never been any pain tenderness or fever He has not lost in weight or strength and has worked up to the time of coming to the hospital Has never had any sore throat or toothache His family and marital histories are negative

He denies gonorrhea and syphilis He is a moderate drinker and uses tobacco to excess

On examination we note that he is of robust appearance and apparently in good health except for a prominent swelling of the right side of the neck This swelling extends from the lobe of the ear to the clavicle and from the anterior margin of the right trapezius to within an inch of the midline anteriorly It is most prominent at the upper part The skin appears normal over it To palpation the superior part occupying the submaxillary triangle is a firm lobulated mass—not tender Toward the clavicle discrete firm ovoid nodules varying in size from that of a pea to an olive can be made out The large superior mass is about the size of a goose egg The skin is freely movable and the entire mass is quite freely movable on the underlying struc

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tures The nodules, for the most part, are freely movable one
from the other No fluctuation can be made out This lesion is
a chronic process involving the lymphatic glands of this side of the
neck A differential diagnosis involves consideration of tuber
culosis, lues, chronic coccal lymphadenitis leukemia lymphosar
coma, Hodgkin's disease, and possibly metastatic carcinoma
Further clinical and laboratory findings will serve to differentiate

Examination of the mouth shows the teeth in good shape
The pharynx is injected and the tonsils visible but apparently
otherwise normal No ulcer is visible The lymph nodes of the
left side of the neck are barely palpable Palpable glands are
present in the right axilla, none in the left The inguinal nodes
are palpable, but not larger than is usual in adults The lung
findings are negative, as is percussion of the mediastinum
x Ray examinations of the lungs and mediastinum are negative
Palpation of the abdomen reveals a spleen which can be distinctly
felt, with a hard sharp margin descending on inspiration three
fingers below the costal margin Further examination is nega
tive

If this were a tuberculous process of the usual type we would
expect at this date to find its different stages, namely caseation
and breaking down with fluctuation and fistula formation in the
upper glands There would also be more peri adentis resulting
in matting together as well as involvement of the skin and under
lying tissues The absence of another demonstrable tuberculous
focus in the body or rise of temperature and the enlarged spleen
also speak against tuberculosis It is possible, however, for the
rarer hyperplastic type of tuberculosis to give such a picture

This is evidently not lues, because of the negative history
and Wassermann Such involvement would be secondary to a
sore in the mouth, most usually the primary lesion, which is
not present

If this were due to a common pus organism, but one or two
glands would be involved with some of the signs of inflammation
present

Lymphosarcoma is of more rapid growth and very early in
filtrates the tissues of the neck and skin Pain would also be

present after five months' duration and the general health of the patient affected. We would expect to find a hard, immovable mass instead of soft discrete glands.

Carcinoma can be eliminated because of the lack of a primary growth, but more particularly because of the character of the glandular enlargement. In carcinoma only one or two glands are involved as a rule, which are hard, round and of small size. The age of this patient would also be against such a diagnosis, but it is well known that nasopharyngeal carcinoma is liable to occur in young adults and escape detection, the first indication being the metastatic involvement of the cervical lymph nodes. This might well be a case of lymphatic leukemia. The blood count, however, excludes such a possibility. The white cell count shows 10,600 with 87 per cent polymorphonuclears, 8 per cent small mononuclears, 9 per cent large mononuclears, and 4 per cent transitional cells.

Hodgkin's disease remains for consideration. The extensive involvement of the cervical glands, which have remained discrete, with the enlarged spleen, blood findings, and other features of the case fit in well with Hodgkin's disease. Some days ago we excised a gland from the lower end of the chain just above the clavicle. Cultures were made, with negative result. The pathologist's report of the sections state that there is marked thickening of the capsule, marked fibrosis of the gland stroma, a few multinucleated giant cells, many eosinophils. There are many areas of necrosis, and round cells and phagocytic infiltrating cells.

Until recently several pathologic conditions have been confused with Hodgkin's disease—principally tuberculosis and lymphosarcoma. At present it is recognized by most clinicians as an entity. A number of years ago the microscopic picture of the gland section was described by Dorothy Reed and others, and is recognized as distinctive. The typical gland structure is lost. Marked sclerosis of the trabeculae, thickening of the capsule, epithelioid giant cells swollen endothelioid cells and many eosinophils are the main features.

A few years ago Bunting and Yates described a diphtheroid

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METASTATIC SARCOMA OF LUNG WITH HYPERTROPHIC PULMONARY OSTEO-ARTHROPATHY

Summary A patient complaining of the sudden onset of pain in the wrists hands, and knees coincident with the appearance of cough pain in the chest, and dyspnea one year after amputation of leg for sarcoma the diagnosis possible importance of congenital syphilis in the etiology of hypertrophic pulmonary osteo-arthropathy

THIS young man twenty eight years old, a Lithuanian, entered our service October 27, 1917, complaining of pain in the side, cough, and difficulty in breathing The pain is low in the left chest and increased on taking a deep breath The cough is paroxysmal and brings up a small amount of pure blood with frothy mucus, never any pus

Onset —Two months ago he first noted pain in the upper part of the left chest with some dyspnea After two weeks he consulted a physician who aspirated about a dram of bloody fluid from the chest Coincident with the beginning of chest symptoms the wrist, hands, and knees became painful and so sensitive to motion that he could not use them This condition, although not so marked now as formerly, has persisted During the past six weeks there has been occasional spitting of blood

Past History —During February, 1916 he first noticed pain and swelling just above the left knee In two months' time the pain became so severe that he had to give up work as a machinist The pain was greatly aggravated by use of the leg It was often worse at night and in the morning being alleviated somewhat by moderate use

To obtain relief he entered this hospital May 30, 1916 Examination at that time showed the patient to be well-developed and apparently in good health He walked with a slight limp, favoring the right leg There was present a generalized lymphadenopathy

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organism cultured from the glands It was a non acid fast bacillus which produced, when injected into monkeys, lymphatic changes analogous to those of Hodgkin's disease Rosenow isolated a similar organism from which he made a vaccine which was used in the treatment of cases with apparently beneficial results, although riper experience has failed to confirm them. The Bunting organism is thought by some to be an accidental finding, for it has been isolated in a variety of gland enlargements, notably in leukemic glands It has been suggested that it is a modified form of the tubercle bacillus

Bunting claims that the blood picture is distinctive and of diagnostic importance A moderate leukocytosis with increase of blood plates and an increase of transitional cells are the principal early features

Bunting and Yates advised early radical excision of the glands followed by x-ray and vaccine treatment It is my intention tonight to excise the large pocket of glands in the submaxillary triangle

A transverse incision is made under the shadow of the mandible By blunt dissection principally the glands packed closely together and flattened where they impinge, are removed and the wound closed with interrupted silk sutures, leaving a strip of gutta percha for drainage Upon incising one of these glands you notice that the cut surface is pinkish gray The capsule and trabecula are markedly thickened, the latter dividing the parenchyma into lobulated areas which stand out above the cut surface Several pinhead yellow areas are seen The parenchyma resembles tumor tissue

There can be little doubt that we have here a case of Hodgkin's disease The treatment will be carried out with x ray and arsenic

patient says resulted from a sore during childhood is present over the upper part of the sternum

The abdomen is negative

There is general glandular adenopathy of moderate degree the largest glands being in the left groin they are about the size of lima beans

The right leg has been amputated at the middle of the thigh and a vertical scar present in Scarpa's triangle indicates that the regional glands were removed

The ends of the fingers show marked clubbing and some cyanosis The end phalanges of the toes are of similar shape although not so marked The nails are curved over the ends Marked thickening of the lower ends of the ulnae can be felt as well as definite thickening of the inner malleoli There is tenderness of the metacarpal and metatarsal bones and of the bones about the wrists and ankles

Further examination is negative The teeth do not suggest congenital lues

The left chest has been aspirated and about 2 drams of bloody fluid obtained This contained cellular debris connective-tissue cells fat droplets and no bacteria On examination of the sputum many red blood cells a few leukocytes and many bacteria but no acid fast bacilli were found

The blood count showed 8200 leukocytes

The urine contained a moderate amount of albumin

The temperature has been normal since he entered the hospital a week ago

We have the plates of the original growth taken in May 1916 You will note the indefinite bony shadow growing from the lower and outer part of the shaft of the femur the structure of the latter apparently intact The outer margin of the growth has a furred appearance This was most probably an osteosarcoma of periosteal origin

During the past week x ray plates of the chest and practically the entire bony skeleton have been made In the chest plate you can see the mottled appearance of both lungs and the dense shadow occupying the lower left chest (Fig 124) The dense

There was present a rather indefinite swelling involving the right femur just above the knee joint. There was tenderness over the most prominent part but no fluid in the joint stiffness or other signs of acute inflammation

The lungs and further physical examination were negative. x-Ray plates of the femur showed a very marked periosteal thickening on the under and posterior part of the femur just above the knee-joint suggesting a tumor. The roentgenologist stated further that changes in other portions of the shaft suggested osteomyelitis and stated that the whole picture showed some resemblance to a luetic process. x Ray plates of the chest were negative

A diagnosis of periosteal sarcoma was made and the patient advised to submit to amputation. This was refused and he left the hospital

The tumor continuing to grow the patient three and a half months later entered another hospital where on September 30 1916 amputation was performed at the middle of the thigh and the inguinal glands of the right side removed. Following the amputation he was able to do light work as a janitor's helper until the onset of his present trouble

He denies other illness and venereal infection. His family history is negative

Examination—You note that this young man is well muscled that he lies on his left side and seems to be distressed greatly by paroxysms of coughing. There is some cyanosis apparent and dyspnea is quite marked. He gives the general appearance of being quite ill. The scanty sputum raised is bloody. Examination of the chest shows limitation of motion on the left side. There is flatness to percussion on the left side of the chest posteriorly from the spine of the scapula down and in front from the level of the nipple down. The right chest is hyperresonant. Tactile fremitus is absent on the left present on the right. Breath sounds are very faint over the flat area. Crepitant râles are heard at the level of the fourth rib and coarse râles lower down. Heart dulness extends one finger to the right of the sternum. A superficial scar 2 inches in diameter which the

cially those of the extremities It is further marked by 'clubbing' of the fingers and toes and by an acute onset with pain swelling and disability coincident with marked respiratory embarrassment Although the patient gives no history of chills
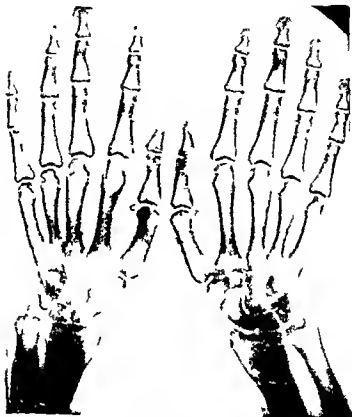

Fig 125 Roentgen gram Illustrating the wided distribution of the periosteal changes

or fever the periosteal symptoms are definitely those of an inflammatory process

Although Bamberger was the first to call attention to this condition Marie studied it more carefully and gave to it the

rounded shadows through the lungs vary from 2 to 6 cm in diameter and probably represent metastatic sarcoma nodules The plates of the bones show areas of marked periosteal thickening The end phalanges of the fingers appear larger than usual. Along the lower third of each ulna is the most striking new growth of bone There is a dense periosteal growth about ⅛ inch in thickness outside of which is a furry newer bone deposit (Fig 125) The tibiæ show similar new periosteal bone growth

Fig 124—Roentgenogram of chest The sarcoma nodules appear as circular shadows they are particularly prominent in the part of the picture showing the left lower chest

Along the first and fifth metacarpal bones is seen a rough new deposition of bone The femora (Fig 126 127 and humeri show periosteal thickening of lesser degree The skull and spine appear also to be thickened

We have to deal with a condition which has resulted in new periosteal bone formation of a large number of the bones espe

majority of cases are secondary to chronic suppurative conditions of the lung (See Phemster "Chronic Lung Abscess with Hypertrophic Osteo arthropathy," THE SURGICAL CLINICS OF CHICAGO, April, 1917) A few cases have been reported following carcinoma and sarcoma of the lung Suppurative conditions of the urinary tract and chronic jaundice are likewise said to produce it The principal interest attaches to the etiology of the productive periostitis, which is at present unknown Clubbing of the fingers always accompanies the periostitis, so that stagnation in the systemic circulation resulting from interference in the pulmonary circulation is thought to play a rôle Because of the large percentage of cases following chronic pulmonary tuberculosis, Marie and others believed it due to tuberculosis, probably the toxins, for the pathology is not that of a tuberculous process Others have thought it of leutic origin

In this case it is difficult to explain the condition coming on following a metastatic sarcoma of the lung It seems to me, however, that congenital lues should be considered as a possible factor The large scar over the manubrium, a favorite site for periosteal gumma and the general glandular adenopathy, seem to give this some support Wassermann tests were negative Still as is well known, this may be so, especially in congenital bone syphilis We know that the periosteum is one of the favorite sites of activity of the spirochete and that the pathologic process resulting is an ossifying periostitis It is possible that the cyanosis of the tissues brought about by the lung condition rendered active the latent organism

It seems possible that such a common factor might explain many cases of this condition which is preceded by such a variety of primary pathologic lesions

Note—The patient died November 17, 1917 and an autopsy was held the same day Numerous tumor nodules were found in both lungs, varying in size from 05 to 6 cm in diameter These were of a pinkish gray color Some showed degeneration in the center, others were partially ossified There was a left adhesive pleuritis The left lower lobe showed a hemorrhagic solidification

name of hypertrophic pulmonary osteo arthropathy Our case
has the main features considered characteristic namely ' club-
bing'' of the fingers and painful ossifying periostitis of acute

Figs 126 and 127—Roentgenogram illustrating the side of the bone of the small metacarpal fingers

onset There are no joint changes and according to Barker the
usual case shows none It has been suggested that a more ap-
propriate name might be toxicogenic osteoperiostitis The large

majority of cases are secondary to chronic suppurative conditions of the lung (See Phemister Chronic Lung Abscess with Hypertrophic Osteo arthropathy THE SURGICAL CLINICS OF CHICAGO April 1917) A few cases have been reported following carcinoma and sarcoma of the lung Suppurative conditions of the urinary tract and chronic jaundice are likewise said to produce it The principal interest attaches to the etiology of the productive periostitis which is at present unknown Clubbing of the fingers always accompanies the periostitis so that stagnation in the systemic circulation resulting from interference in the pulmonary circulation is thought to play a rôle Because of the large percentage of cases following chronic pulmonary tuberculosis Marie and others believed it due to tuberculosis probably the toxins for the pathology is not that of a tuberculous process Others have thought it of leutic origin

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It seems possible that such a common factor might explain many cases of this condition which is preceded by such a variety of primary pathologic lesions

Note—The patient died November 17 1917 and an autopsy was held the same day Numerous tumor nodules were found in both lungs varying in size from 0.5 to 6 cm in diameter These were of a pinkish gray color Some showed degeneration in the center others were partially ossified There was a left adhesive pleuritis The left lower lobe showed a hemorrhagic solidification

Examination of several of the bones at the seat of greatest thickening revealed a markedly thickened periosteum. These areas were dark red apparently very vascular. Other autopsy findings were negative. Sections of the hemorrhagic consolidation of the left lower lobe showed no tumor tissue simply broken down tissue. The tumor nodules on section gave the typical picture of a spindle-celled sarcoma with areas of ossification.

Summary Clinical methods of differentiating bone sarcoma from tuberculosis and gumma in osseous tissue value of x ray analysis treatment of present case by amputation at middle of thigh

This patient, twenty one years old, comes to the hospital be cause of pain, swelling, and disability of the right knee.

He attributes his present trouble to a sprain received November 15, 1916 While carrying a heavy sack of flour he slipped, twisting the knee He was able to continue at work, and there was no swelling or discoloration noted Not until May, 1917, did pain appear This was a dull ache, made worse by use of the knee disappearing after rest About the same time swelling was noticed on the inner side of the leg just below the knee This has gradually grown, with an increasing disability, so that in the past six weeks the knee has become partly flexed, and he now walks with the aid of a cane

Past History —Measles in childhood, frequent attacks of tonsillitis and bronchitis in the last five years

Family History —He knows of no tuberculosis or tumors in other members of the family Mother died of 'stomach trouble" and a brother of 'bowel trouble'

The patient denies venereal infection The appetite has been good and he does not believe that there has been any loss of weight In the last two weeks there has been some cough but no sputum there has been no dyspnea nor pain in the chest

Upon examination we note that he is a pale, slender young man who walks with a limp because of the flexed knee which necessitates the aid of a cane Upon exposing the right knee there is seen a swelling about the size of an orange occupying the mesial anterior aspect of the leg just below the patella (Figs 128 129) Its margins are indefinite and the contour irregular, two main elevations being apparent Veins passing over the surface are dilated otherwise the skin is of normal appearance The internal hamstring tendons stand out prominently on ac-

count of passing over the swelling   Proper extension of the leg
is thus limited   There is local elevation of temperature when
compared with the left knee   The mass is of variable consistency
but for the most part soft the anterior nodule opposite the tibial
tubercle apparently showing fluctuation   The skin is freely
movable   The tumor is firmly fixed to the tibia and its outlines
are indefinite   The knee joint does not seem to be involved and
there are no signs of fluid in the joint

Figs 178 and 179   Sarcoma of upper end of tibia   The extent of the swelling
the dilated, superficial vein   and the stretched tendons of the internal hamstrings
are well shown

An x ray plate of the lesion shows that it involves the upper
end of the tibia which has been eroded to the extent of one third
of its diameter (Fig 130)   There are short scalloped-out areas in
the bone and no calcination or new bone formation in the
growth which stops abruptly at the articular cartilage   The
lateral boundary blends with the shadow of the soft tissues and
cannot be outlined

Further examination reveals palpable lymph nodes in the
groin both the vertical and oblique sets on the right being en
larged

The lungs are negative Fluoroscopic examination is negative for possible tuberculosis or metastases

The teeth are carious and the tonsils hypertrophied

The blood Wassermann is negative There has been no rise of temperature during the past week since the patient entered the hospital

Fig 130 —Roentgenogram showing extensive destruction of the tibia including diaphysis, metaphysis and epiphysis Note absence of evidence of new bone production

In arriving at a diagnosis we are again confronted with the problem of differentiation between a chronic inflammatory process and a new growth

On account of the age and general appearance of the patient, and the cough the possibility of tuberculosis should be considered

In fact, the case was admitted to the hospital on superficial examination as one of tuberculosis of the knee. The nodular solid character of the tumor and the roentgenogram findings are however not those of tuberculosis. The regular outlines of the eroded areas in the bone, absence of rarefaction in the neighborhood with absence of involvement of the articular cartilage and knee joint, argue against such a diagnosis.

The history, the negative Wassermann, and the entire absence of new bone formation when considered with the localization and size of the new tissue growth speak against gummas.

We probably have to deal with a true tumor which, because of the rather rapid development and lack of encapsulation, appears to be malignant. It is most likely a sarcoma. The sharp outline of the scallops in the tibia suggest the possibility of a giant-celled sarcoma originating in the marrow.

We have advised the patient of the malignancy of the lesion and he has consented to amputation.

Operation (October 10 1917)—In order first to determine the exact nature of the growth we will excise a piece from the most prominent part and send it to the laboratory to have a frozen section made. We come upon pink tumor tissue beneath the muscle which is quite vascular. A wedge-shaped piece is excised. The pathologist reports the growth to be a sarcoma of the large spindle-celled type without giant cell.

After applying a constrictor of large soft rubber tubing in figure-of-8 fashion about the thigh and pelvis, we proceed to amputate at the middle of the thigh. Anterior-posterior flaps are directed up consisting of skin subcutaneous fat and fascia. The muscles and other structures are incised at the proper level, the sciatic nerve being injected with 1 per cent novocain before severing. This is done to combat shock. A cuff of periosteum is removed proximal to the site selected for the saw-cut and the bone sawed through. The endosteum is curetted out for about ⅓ inch vessels ligated and flaps sutured leaving a cigarette drain at one angle.

After preparing the specimen removed by cutting through its center and sawing the tibia you see that the surface is grayish

pink and soft with very little secretion (Fig 131) It is solid throughout and stops abruptly at the articular cartilage on top of the inner tibial tuberosity Although it extends above the joint margin on the inner side it has not broken through the synovial membrane Careful examination of the veins of the

Fig 131 —Photograph of sarcoma after removal and medial section

thigh shows them empty tumor tissue being nowhere found in them

The prognosis is probably not good The duration of growth the poor general condition of the patient and the beginning lung symptoms already suggest metastases

As a further aid in treatment the Coley toxins might be employed The results reported by others than Coley with their use in such cases have not been encouraging

GIANT-CELLED SARCOMA OF ULNA

Summary A man with definite lues and nephritis who complains of rheumatic pains and swelling in various joints and particularly of a large lump on ulnar side of the left wrist differential diagnosis of giant-celled sarcoma, chondroma multilocular bone-cyst and central gumma operation—resection of tumor and repair of consequent defect in ulna by transplantation of bone from the tibia

This man is thirty six years old, a bookkeeper by occupation, who enters the hospital because of a growth on the left forearm He also complains of pain in the ankles, left knee and soles of the feet

Two and a half years ago the left forearm was twisted in a tussle The pain and disability following were slight and of only a few days' duration Six weeks later he first noticed a small, hard nodule over the lower end of the ulna This has grown gradually, without pain at any time, and is only slightly tender to blows and upon extreme supination of the hand Lately there has been some noticeable weakness of the grip

In June, 1917, there developed pain and stiffness of the neck At times the pain was sharp and shooting in character This lasted about one month In September pain appeared in the back and the right ankle became swollen and tender Shortly afterward the right elbow became swollen and painful, subsiding in a few weeks, but leaving a hard prominence over the olecranon, so that at present he is unable to completely extend the forearm About two weeks ago a stiffness and soreness of the left knee appeared, most marked in the morning and gradually wearing off during the day after being about Pains in the soles of the feet have become so annoying that he gets about with difficulty To obtain relief from this is his principal reason for coming to the hospital At no time has there been any fever or chills Only in the last few weeks has he had to quit work

Past History —Typhoid fever at fifteen years Gonorrhea and soft chancre twelve years ago At that time there was an

ulcer involving a large part of the glans penis, accompanied by "rheumatism" of several joints, which was severe and of several months' duration

The family history is negative except for the fact that his father died of Bright's disease He drinks whisky to great excess He states that his work requires him to enter refrigerators, and believes that this has something to do with the present "rheumatic condition"

Upon examination we note that he is of slender build and apparently in good health

At the wrist on the ulnar side is a swelling about the size of a hen's egg occupying principally the dorsal and inner aspects The skin over it appears normal. Movement of the hand is not painful and only limited to a small degree by the growth. To palpation the latter is irregular in contour, but sharply limited The consistency is variable, most parts being quite hard The skin is freely movable The growth is attached to and a part of the ulna, the inner margin of which forms a groove between the two most prominent parts of the tumor Movement shows the muscles to pass over the mass

Further examination reveals a marked pyorrhea alveolaris A small raised area over the right olecranon probably a result of periostitis, is present There is slight swelling and tenderness of the soft tissues below the left knee, the joint being entirely free There is moderate edema of the ankles. Tenderness to pressure is quite marked on the plantar surfaces of both feet, most marked over the os calcis at the attachments of the plantar fascia and tendo achillis

In order to approximate a diagnosis of the ulnar lesion we will have to depend largely upon the x ray examination Clinically it shows none of the signs of an inflammatory process.

The blood Wassermann is 4 plus The urine shows a large amount of albumin and many granular casts

An x ray plate has been made, and you note that the picture is that of a new growth of a type which has expanded and nearly obliterated the lower end of the ulna, only the inner margin of the bone remaining (Fig 132) It shows a thin, bony shell, the

outline of which remains unbroken   You note also that there
are delicate trabeculæ through the interior of the growth   There
is some rough thickening of the periosteum of the shaft just
above it   This appearance fits in best with a tumor which has
probably had its origin in the interior of the bone producing
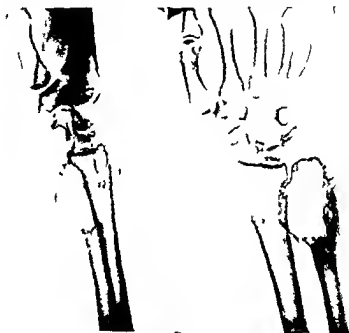expansion to its present globular shape by bone absorption   This

Fig 132 — Roentgenogram showing expansile rather than infiltrating tumor of
ulna   The unbroken bony shell and the sharp demarcation the absence of areas of
calcification and of left intestinal divisions within the swelling are the striking charac-
teristics

is probably a sarcoma of giant celled type called by some mye
loma

A chondroma shows more mottling due to the areas of cal
cification Furthermore chondroma does not involve the ep
iphysis and is of slower growth unless undergoing malignant
change

ulcer involving a large part of the glans penis accompanied by *rheumatism of several joints* which was severe and of several months duration

The family history is negative except for the fact that his father died of Bright's disease He drinks whisky to great excess He states that his work requires him to enter refrigerators and believes that this has something to do with the present rheumatic condition

Upon examination we note that he is of slender build and apparently in good health

At the left wrist *on the ulnar side is a swelling* about the size of a hen's egg occupying principally the dorsal and inner aspects The skin over it appears normal. Movement of the hand is not painful and only limited to a small degree by the growth. To palpation the latter is irregular in contour but sharply limited The consistency is variable most parts being quite hard. The skin is freely movable The growth is attached to and a part of the ulna the inner margin of which forms a groove between the two most prominent parts of the tumor Movement shows the muscles to pass over the mass

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a part of the ulna Should there be recurrence amputation can then be carried out

x Ray plates of other bones of the body are negative except for some periosteal thickening over the right olecranon

Fig 133—Two weeks after operation Fibal transplant now occupies the former site of the tumor

Operation —After proper preparation we make an incision 5 inches long over the inner side of the tumor and ulna separate the muscles and saw off the ulna 1 inch above the growth with the Gigli saw using Lane technic throughout Grasping the free end of the ulna with bone holding forceps the tumor is removed intact principally by blunt dissection A piece of bone

Multilocular bone-cyst is a variety of chondroma which in the x ray plate shows more clearly marked outlines of the lighter areas than is here present. The bone expansion is also less as a rule

Central gumma shows a denser shadow, with irregular out line and without structure. Rarely it gives a multiple cystic appearance but there is an accompanying cortical new bone formation. It usually involves the shaft very rarely the epiphysis. There should also be some clinical evidence of inflammation

In this case the x ray appearance with the history of a very slow growth of two and a half years and the clinical findings without infiltration of the surrounding tissues bear out a diagnosis of myeloid giant-celled sarcoma of benign type

This variety of sarcoma of the long bones is held by most authorities to be essentially a benign growth. Bloodgood and many others believe that it never forms metastases to the lymph nodes or viscera. Coley and others cite cases to show that metastases although showing giant cells in sections are clinically of rapid growth with early cachexia. The typical myeloid giant cell sarcoma is of very slow growth and on removal gives rise to only local recurrence. It occurs most commonly in the jaw and lower end of the femur radius and ulna and is amenable to local removal either by curet or resection. Bloodgood reported 7 and Nasse 8 cases of this type of tumor in which local removal was carried out without metastases although a few recurred locally. Some text books speak of this tumor as a myeloma meaning simply a new growth of the marrow but it seems that this term had best be reserved for the multiple tumor growths of the marrow characterized by the presence in the urine of the Bence-Jones body

The tumor of the ulna is the main object of interest in this case. The diffuse painful foci may be periosteal possibly of luetic origin and would seem to be a pathologic process having nothing to do with the new growth of the ulna. Inasmuch as there is no apparent infiltration of the soft tissues and a good functional result is assured we have decided to resect the tumor with

a part of the ulna Should there be recurrence, amputation can then be carried out

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Operation —After proper preparation we make an incision 5 inches long over the inner side of the tumor and ulna separate the muscles and saw off the ulna 1 inch above the growth with the Gigli saw, using Lane technic throughout Grasping the free end of the ulna with bone holding forceps the tumor is removed intact principally by blunt dissection A piece of bone

3¼ inches long and ¼ inch wide is then removed by means of the circular motor saw from the mesial surface of the left tibia, being careful to preserve the periosteum Experimental work tends to show that it is of distinct advantage to leave on the periosteum The medullary cavity of the ulna is hollowed out for a short distance, and one end of the graft sharpened to fit into it The graft is then wedged into the ulna, no other means of fixation being used, and the soft tissues sutured over it with No 1 iodized gut A subcuticular stitch is then inserted and the forearm put up in anterior and posterior padded splints We expect to keep the forearm immobilized for about four weeks and then begin massage and passive motion

This tumor removed now shows definite "egg-shell" crackling due to the very thin layer of bone You see that there is a thin layer of muscle over the anterior surface removed with the tumor Sawing the growth through the center, the cut surface appears quite homogeneous smooth and dirty yellow, resembling very much a gumma There are evident some bone trabeculæ (Fig 133)

Note —The pathologist reports that the section is that of a mixed cell sarcoma with many large multinucleated giant cells

CLINIC OF DR DAVID C STRAUS

MICHAEL REESE HOSPITAL

EXTENSIVE COMPOUND ELEVATED SKULL FRACTURE, WITH CONSIDERABLE LACERATION OF THE BRAIN

Summary History of case—the examination—the diagnosis—the operation post operative course drainage in cases of skull injury the healing of bony defects of the skull

THE patient Peter G a boy ten years of age was brought to the hospital in an ambulance the morning of July 4 1917 He was unconscious and had a bandage about his head

His brother who accompanied him gave the following story of the accident The boy who had been playing baseball in a lot was called over by some other boys who had found some explosive in a large country milk can They had attempted to set off the explosive but it did not explode as quickly as they thought it ought to and believing that they had not ignited it they asked Peter to lift off the lid which was quite heavy Just as he was about to lift off the lid the explosion occurred and the lid was blown up striking him a terrific blow in the forehead People who witnessed the accident say that the top of the can after striking him in the head blew up in the air about five stories

When the boy was reached he was unconscious and was bleeding from the wound in his head which exposed his brain and brain tissue was scattered over his forehead and hair

He was at once taken to a hospital but after they had applied a dressing his brother decided to bring him to the Michael Reese Hospital

I saw him as soon as he was brought into the hospital and took care of him immediately On removing the bandage from about his head it was seen that the explosion had lifted up a large osteoplastic flap in the right frontal and temporal region There

was a long curved cut extending through the entire thickness of
the scalp and the skull, with elevation of a flap extending from
the median line in the neighborhood of the coronal suture, down
ward in a curve almost to the right superciliary ridge, and then

Fig 134—Photograph of patient taken July 22 1911 eighteen days after
operation. The distance a–b shows the extent of the accidental scalp wound the
extensions a–c and b–d were made at operation The two granulating areas along
the line a–b, one above each canthus of the right eye show the points where drainage
was instituted.

curving upward and backward to the right temporal region
(Fig 134, a b)

This osteoplastic flap was elevated about 1 inch so that one
could easily have inserted the entire side of one s hand into the
skull. The brain lay freely exposed and one could plainly see its
expansile pulsations Also one could see that the dura was torn

and that the brain was lacerated There was blood and brain matter matted in the hair, which lay in the wound where this extended in the hairy scalp

Before attending to the local injury a brief but rather complete general examination was made

The boy presented the typical picture of severe cerebral concussion He was unconscious, in shock, and had a rectal temperature of 96 2° F and a pulse of 48 His pupils were widely dilated There was some bleeding from the mouth This was, in part at least, due to the fact that a tooth had been broken away, the right lower cuspid Furthermore, there was some blood in the right ear, though no actual bleeding This apparently had flown in from the scalp cut, rather than from a basal skull fracture through the petrous portion of the temporal bone The existence of a basal skull fracture was thought of as possible, by extension to the base of the fracture of the vault However, no definite proof of this was obtainable, although the evidence mentioned made this possible, if not probable Though unconscious and not to be roused, the boy tossed about restlessly He was therefore given a hypodermic injection of morphin sulphate, gr ⅓, and atropin sulphate, gr 1/150 Examination of the extremities showed that the deep or tendon reflexes that is biceps jerk, triceps jerk, supinator jerk knee jerk, ankle jerk, were present, normal and equal on both sides, thus showing that there was probably no upper motor neuron lesion The Babinski test was negative, thus making the absence of an upper motor neuron lesion probable, though this is not conclusive, because immediately after a lesion Babinski sign and exaggerated reflexes may not be in evidence but may appear later Indeed, the reflexes are frequently absent immediately after such a severe trauma One would not expect any paralysis if the lesion were limited to the right frontal lobe, for this you no doubt remember, is not a motor area, but is a silent area The motor areas are limited to the two precentral gyri the right precentral gyrus being the motor area for the left side of the body, and the left precentral gyrus being the motor area for the right side of the body The precentral gyrus is the convolution just in front

of the fissure of Rolando It was formerly believed that the
motor area extended behind the fissure of Rolando and included
part of the postcentral gyrus that is the convolution just pos-
terior to the fissure of Rolando We now know that the motor
area is confined to the precentral gyrus

An important point to remember in a case such as this one
is that even though a blow is sustained on the right side of
the head one has to think of the possibility of an injury to the
opposite side of the skull and brain by contrecoup As just
explained the findings in this case ruled out the existence of any
injury to the left motor area

As it was evidently impossible to properly clean the wound and
the area about it while the boy tossed about as soon as the
examination was completed he was taken to the operating room
and given a gas-ether anesthetic After he was anesthetized
the area about the wound was shaved widely cleaned with green
soap and water then with alcohol, ether and half-strength tinc
ture of iodin Finally the area immediately about the scalp
cut was similarly cleaned but care was taken not to allow any of
the solutions to enter the wound.

Operation.—The head was laid on the left side and was sup-
ported on a sand bag The two extremities of the scalp wound
were next extended posteriorly using a scalpel and following
the line of fracture first on the medial side (Fig 134 *a–c*) and
then on the lateral side (Fig 134 *b–d*) until the entire length
of the fracture was exposed By doing so each extremity of
the skin cut was prolonged first somewhat laterally and then pos-
teriorly so that when the entire fracture was exposed a horseshoe
shaped skin flap had been cut (Fig 134 *d–b–a–c*) This was
approximately anteroposterior in position with the pedicle
posteriorly (Fig 134 *d–c*) The pericranium was next cut
through immediately over the fissured part of the fracture (Fig
134 *a–c* and *b–d*) and then the anterior and posterior edges
of the pericranium were pushed away from the line of fracture
for a short distance the anterior edge anteriorly and the poste
rior edge posteriorly by means of a periosteal elevator Then
the elevated anterior part of the horseshoe-shaped osteoplastic

flap was strongly raised by means of a periosteotome, elevating the flap until the bone flap fractured at its base (Fig 134, d–e and Figs 135, 136) The entire osteoplastic flap was now turned upward as one mass, exposing the dura beneath this entire area of the skull There was considerable foreign material lying on the dura, and some lying on the inner surface of the

Fig 134 Lateral roentgenogram taken July 1, 1917 twelve days after operation Note the size of the osteoplastic flap Also note the extent of the bony defect the result of cutting away with a rongeur forceps the margins of the bone flap and also the margin of the skull from which this has been raised in order to be certain to remove all the infected bone

elevated bone flap Before dealing with this foreign matter the margin of the osteoplastic flap was swabbed with pure tincture of iodin as was also the margin of the scalp and skull from which this osteoplastic flap had been elevated In the treatment of compound skull fractures when gross dirt has been driven into the edges of the scalp cut or when the margins of the scalp

wound have been devitalized one should excise the margin
by the use of a sharp scalpel That did not seem necessary in
this case Two free fragments of skull bone were seen project
ing into the substance of the frontal lobe of the brain and there
were two tears in the dura through which the two bone frag
ments had been driven into the brain tissue Each of these
tears in the dura was approximately ¼ inch in length They
were situated in the line of the original cut and were separated

Fig 156 — An orthos erior horn enormous taken Jul 1 191   twel e da a er
operation The tn rs correspond to those in Fig 155

by a bridge of intact dura These tears in the dura were located
along the line *a b* Fig 154 one above each canthus of the
right eye Drainage was subsequently introduced at these two
points Before proceeding to deal with these depressed frag
ments or to inspect the damage done to the brain the foreign
matter lying upon the dura and on the inner surface of the
bone-flap was gently irrigated away with a 1 10 000 solution
of bichlorid of mercury from a percolator fitted with sterile tub
ing to which a fine glass irrigating point was attached Then the

two fragments of bone were removed from the substance of the frontal lobe and following this the cavities in the brain from which these had been extracted were gently irrigated with the same solution The tip of the right index finger was then introduced into the medial cavity in order to determine whether any other bone fragments were present but none were found The lateral cavity was examined in the same manner but no other fragments were to be found here either However this examination disclosed the fact that both openings led down into one large cavity in the frontal lobe and that this cavity was covered only by the bridge of dura between the two tears

Next the margin of the bone-flap was cut away with a rongeur forceps (Borchardt s) as was also the margin of the skull from which the flap had been raised About $\frac{1}{4}$ inch of the margin of each was removed This was done in order to remove all the infected bone caused by the contact with the top of the can A broad horseshoe-shaped bony defect thus resulted (Figs 135 136) Then in order to be sure that no depressed portion of the inner table had been overlooked and left depressed a thin delicate brain elevator was introduced between the dura and the inner surface of the skull all about the edge of the wound The depressed parts having been elevated the entire wound was again irrigated and carefully cleaned A small soft rubber drainage-tube was introduced into the cavity in the frontal lobe passing it in through the lateral tear of the dura and out through the medial tear so that the drainage tube lay just beneath the dural bridge The osteoplastic flap was next replaced and one end of the rubber drain came out to the medial side of the anterior part of this flap and the other end came out from beneath the lateral side of the flap that is through and through drainage was instituted

In regard to the use of the rubber drain in this case which may be criticized by some surgeons I wish to call attention to the advice of some of the foreign surgeons as the result of their recent experiences in the present war Thus Guleke believes that in cases with considerable destruction of brain tissue early decompression and drainage should be provided for the traumatic cerebral edema and the constant outpouring of brain detritus

He personally prefers a soft rubber drain Similarly Delore and Arnaud[2] advocate the use of a rubber tube for drainage in cases in which the brain is extensively injured and advise that the tube should be left in for a long time to permit the free drainage of the broken-down brain tissue and the products of inflammation They warn against the use of gauze drains in such cases In case a brain abscess has developed Burkhardt[3] strongly denounces gauze drains and gutta percha drains as insufficient Erdely[4] states that rubber tubes give the most satisfactory drainage and von Eiselsberg[5] is of the same opinion but points out that a rubber drainage-tube should not be allowed to remain down in the abscess cavity for more than twenty four to forty-eight hours for fear that prolonged pressure may cause pressure necrosis and thus perforate into the ventricle At the end of this time he shortens the rubber tube though he does not remove it completely Although a rubber drain was used in this case and although as has just been pointed out such drainage is recommended by surgeons of wide experience in general it is best not to put any tube or gauze plug in the cerebral substance

Finally the osteoplastic flap was sewed in place using No 1 plain catgut to close the pericranium and the musculo-aponeurotic layer interrupted stitches being used and then the skin was closed with a running suture of No 3 black waxed silk interrupting this a few times Room was left about both ends of the drain so as to insure free drainage Thiersch powder and dry dressings were then applied The patient left the operating room in good condition His color was fair and pulse was good —72 per minute

While some surgeons have advocated leaving such wounds widely open to assure good drainage or only closing the skin edges with a few stitches Burkhardt[6] has recently pointed out that his experience has convinced him that the infective material that is carried into the brain in case of smaller wounds of the brain give rise to severe infections in only the most exceptional cases In these cases the infection developing after the operation is in the great majority of cases a secondary infection due to the care of the wound just as a joint in spite of aseptic dressing

is sure to become infected if it is left widely open   He believes
that the best means of combating this secondary infection is to
sew the skin together, but not to close it completely, as has been
advocated by some authors (Jeger and Karzer)   He inserts a
drain and closes the skin up to this, as he believes that in this
way he gains the advantages of both the complete aseptic covering
and at the same time efficient drainage

Postoperative Course —He became conscious at 3 30 in the
afternoon, was able to take fluids in small amounts by evening,
and only vomited once at 7 P M, and did not vomit again that
day   He complained of pain in the head

Because of this pain and restlessness he was given morphin
sulphate, $\frac{1}{6}$th grain, hypodermically at 12 30 A M   By morning
he was rational and perfectly clear mentally, though rather som-
nolent   He seemed in good condition   He vomited a little clear
fluid at 3 30 A M, but did not vomit again that whole day, and
was able to take and retain 31 ounces of fluid by mouth   His
temperature (rectal) varied between 99 6° F and 100 4° F, and
his pulse varied between 72 and 100   He spent a fairly good night,
sleeping most of the time

When I saw him the next morning, July 7th, his condition was
about the same as the day before, and he was still rather
somnolent, though perfectly clear mentally   I removed the
dressings from his head in order to remove the rubber drainage
tube   In place of the rubber drainage-tube I inserted two short
gutta percha tissue drains, each going through the scalp openings
only   Dry dressings were applied   He had a good day and was
given a light soft diet in the afternoon   He did not vomit at
all that day   His bowels moved twice   At 8 P M his tem-
perature (rectal) was 101 4° F and pulse 84   He spent a fair
night

The next day, July 8th, he seemed brighter mentally and
less somnolent, and told about lifting the cover from the milk
can   His brothers came to visit him and he recognized them at
once   Temperature around 100° F and pulse 80 to 90

July 9th his condition was just about the same   He was bright
and took nourishment well, but complained of pain in the region

of his wound and said the pain was worse than up to this time   Examination showed no stiffness of the neck   no Kernig sign   reflexes not increased and no evidence of a beginning meningitis

July 10th he seemed about the same   Because of the pain complained of the dressings were changed   There was some purulent discharge from the lateral drainage opening   This of course accounted for the pain

The next day July 11th the dressings were again changed and pus was again present

By July 13th the purulent discharge was more profuse and was now present in both drainage openings   The next day the stitches were removed from the posterolateral and posteromedial extremities of the horseshoe shaped skin cut and a posterolateral and posteromedial drain of gutta percha were inserted in addition to the two anterior drains   After this time the amount of drainage gradually but steadily decreased

On July 16th all remaining stitches were removed and all drains were removed and left out except in the anterolateral opening

On July 19th roentgenograms of the skull were taken to determine whether any loose fragment was present that was keeping up the discharge but no bone fragment or foreign body could be demonstrated   The position of the osteoplastic flap was shown to be excellent (Figs 135 and 136)

The next day the last drain was permanently removed

On July 22d I took a photograph of the boy sitting up in a wheel chair (see Fig 134)

The following morning July 23d he complained of headache and some nausea and he looked pale and did not seem so well   Both anterior wounds where drainage had been maintained were again opened and a little pus retention relieved and two gutta percha drains were again inserted   By evening his temperature was normal again and his headache gone

By July 26th the drains could be permanently removed

From this time on the wounds where the drains had been granulated and had to be cauterized at times as the granulations

became exuberant By August 6th all discharge had ceased and it was decided to send the boy home in a day or two

On August 9th he developed a severe tonsillitis with a rectal temperature to 104 2° F, and on account of this he had to be kept in bed again It was not until August 14th that he recovered sufficiently to let him get out of bed again Four days later he

Fig. 147 —Photograph September 1917 This shows the persistent granulating wound where the lateral portion of the drainage tube had been introduced and from which in September a small spicule was spontaneously extruded following which healing promptly occurred

was sent home with instructions to return for dressings as the two anterior wounds were not yet completely healed

The anteromedial wound soon closed and remained closed The anterolateral wound continued to be moist and discharged a very little pus from day to day One day in September a small spicule of bone spontaneously appeared on the surface of

the granulating wound This was removed and the wound was cauterized with silver nitrate stick as had been repeatedly done before Following this extrusion of the small sequestrum the wound rapidly closed and has remained closed (Fig 137)

The first week in October I took his photograph (Fig 138) as the wound was then entirely healed I also had roentgen

Fig 138 —Photograph taken first week in October t91 Shows wound entirely healed

ograms taken to determine the amount of filling in of the defect As you will note by this time considerable osteo d tissue had developed (Figs 139 140) These roentgenograms show that instead of the sharp clean-cut bony margins of the defect the margins appear less sharp and clean cut and that in the space between the margins the defect now hows more or less bony substance present However at this time the osteoplastic flap still showed visible pulsations and could be rocked by pressure with the examining hand as it had done from the time of the operation. It was not until December that the defect no longer

showed visible pulsations and was so firm that palpation showed it to be rigid

Finally, it may be of interest to say a few words concerning the spontaneous closure of bony defects in the skull

Fig 139—Lateral roentgenogram taken October 13 1917 three months after operation Note how the defect has partially filled in with osteoid tissue, and that instead of the sharp clean-cut bony margins of the defect the margins have become indistinct This is due to the fact that the sharp bone edge is being absorbed while new bone tissue is being deposited to fill in the defect

Kuttner[1] states that the old teaching remains unshaken even today—that the possibility of regeneration of the convex skull bones in case of loss of substance is very slight and therefore,

defects of any consequence as a rule do not ossify but only become closed by connective tissue A few authentic cases of bony closure of such defects by means of bone regeneration have been reported in recent years but these he believes are nevertheless only exceptions worthy of note and only go to prove the rule Such exceptional cases are recorded in von Bergman's Surgery of the Head and since that time a few other cases have been reported as those reported by E Kuter and Hofmeister

Fig 140 Anteroposterior roentgenogram taken October 15 191 three months after operation. The findings correspond to those in Fig 139

Krause states that small defects usually become filled also in adults by such a firm scar that an operation to close it is not necessary In children when both the pericranium and dura are retained ossification proceed from the bony margins of the defect, while the central portion usually remains composed of fibrous scar tissue

Tilman teaches the same

Cushing[10] on the other hand, states that even defects of some size may at times become entirely ossified and even when closed by membrane alone they may become so firm and inelastic as to show no pulsation

Fig. 141 Lateral roentgenogram taken December 13 1917 five months after operation when the osteoplastic flap no longer showed visible pulsation and was firm on pressure Note that the flap is still in good position and the wide channel separating it from the remainder of the skull is filling in with osseous tissue

According to von Bergman[11] defects cannot be expected to close if they exceed 6 to 8 cm in diameter and it would seem that it is rare even for much smaller defects to become filled in with bone

Kuttner[12] points out that numerous defects undergo a partial closure and show rudiments of bone formation but it is never

theless true, in general, that a complete bony closure of larger defects belongs to the exceptions, and that in case of defects 'of more than 6 to 8 cm in diameter is not to be expected

Axhausen[18] states "We know that on account of the very poor osteogenic capacity of the bone of the skull the spontaneous closure of even a small defect does not follow " In all the cases operated upon by Axhausen, even in the oldest, there was no attempt at formation of new bone and the margins of the defect

Fig 142.—Anteroposterior roentgenograms taken December 13 1917 five months after operation. The findings correspond to those in Fig 141

were almost as sharp as when the primary operation was completed In order to secure complete restoration to a normal condition, he states, a secondary filling of the defect is necessary During the last year he has operated upon 28 cases

In this connection the roentgenograms taken in this case after the lapse of three months and again at the end of five months (Figs 139–142) are interesting for they show a definite progress

in the ossification of the defect At the time the last roentgenograms were taken the osteoplastic flap was firmly immobile, felt rigid, and pulsation of the osteoplastic flap was no longer present The boy is apparently perfectly well, and his mentality is excellent

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CLINIC OF DR A J OCHSNER

AUGUSTANA HOSPITAL

GALL-STONES CHOLECYSTOTOMY VERSUS CHOLECYSTECTOMY

Summary A patient with cholelithias s as a part of her abdominopelvic pathology cholecystectomy as a routine procedure in the absence of definite organic obstruction of the cystic duct to be condemned the gauze pack in cholecystot omy—Dr Ochsner's technic.

History—The patient a married woman of forty years was admitted to the hospital September 12 1917 because of a burning pain in the lower abdomen a feeling of weakness in the back and a pain in the right upper quadrant of the abdomen

Her mother died of nephritis at the age of forty nine The family history is otherwise negative She had chickenpox and mumps as a child measles at eighteen with which she was sick three months At nineteen she had stomach trouble which caused sharp stabbing pain in the upper abdomen worse at night She says that food relieved the pain for half an hour She was nauseated often and vomited a few times but never saw blood She had tarry black stools at the time and had had several fainting spells She lost 30 pounds in weight in three months She was in the hospital two and one half months twelve years ago on a milk diet After this the stomach trouble was better and for nine or ten years she had no symptoms Since last fall (1916) she has had two or three light attacks of pain in the epigastrum She had rheumatism three years ago following la grippe and a middle ear suppuration This lasted for eight weeks but she has had many attacks of rheumatism" since mostly in the great toes For the past sixteen years she has had four or five attacks a year of pain in the right inguinal

region. These attacks were called 'appendicitis' by the physician. She had cystitis four years ago lasting three weeks.

Menstruation began at twelve and one-half years. Periods came on every three weeks until she was twenty-eight years of age, and since then have come on every twenty five days. She has been married four years and has one healthy boy. She has had no miscarriages. Several years ago she had leukorrhea but none since the birth of the child.

She drinks two cups of coffee a day and eats heartily, but takes no alcoholic liquors. The bowels are regular.

She comes to the hospital because of the burning pain in the lower abdomen, a feeling of weakness in the back, and pain in the right upper quadrant. She thinks the trouble has been worse since the birth of her child and has been told that she has prolapse of the uterus.

Physical Examination.—The patient is a well-developed moderately obese woman. Color is good and skin is clear. Head neck chest, heart, and lungs are negative. There is marked tenderness with spasm in the right upper quadrant and over McBurney's point, and moderate tenderness in both lower quadrants of the abdomen especially pronounced in the right. There are no masses palpable. The uterus is prolapsed. The cervix is lacerated and nodular. There is a marked cystocele and rectocele present. No rectal examination was made.

COMMENTS

DR. OCHSNER (September 13 1917). In this case we now know that the gall-stones are confined to the gall bladder proper, because I have examined the gall bladder and ducts through this long median incision. I have just completed the removal of the appendix and the shortening of the round ligaments which support the uterus. Consequently it will not be necessary to make an incision here large enough to introduce my hand for the purpose of examining the ducts (Fig 143). Many years ago the statement was made that it was not possible to examine the gall bladder properly without making an incision sufficiently large to introduce the entire hand and undoubtedly that statement was correct,

because with only one or two fingers it is not possible to determine whether stones exist in the cystic, hepatic, or common duct Now, through this little buttonhole which we have made we have brought the gall bladder into view and placed three forceps upon it, two of these forceps are being held by my assistant and one by myself while I plunge the trocar into the gall bladder (Fig 144, 1) This trocar was introduced into this operation some years ago by my brother, Dr Edward Ochsner, and consists of a large
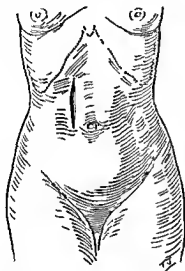
Fig 143 —Line of incision through upper right rectus muscle This is the typical incision for cholecystotomy which Dr Ochsner has employed for many years and not the stab-wound mentioned in connection with the case operated on

size trocar with a side tube so arranged that when the trocar is introduced into the gall bladder the bile can be made to flow out of the gall bladder through the trocar, and is conducted into a basin by the rubber tube, so that no bile can soil the operative field Then I enlarge this opening and swab out the gall bladder by means of this gauze (Fig 144 2)

Now this patient gives a history of having had gastric trouble for eleven years She has gall stones, and they probably got
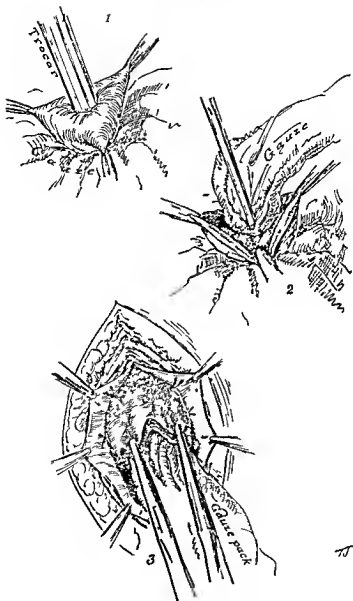
Fig 144

into the gall bladder just about that time Most of them are too large to pass out through the cystic duct and consequently she is not likely to have had a typical gall stone colic Now I have removed all the stones Now the question arises Shall we remove this gall bladder or shall we leave it in place? The lining of the gall bladder is granular and congested and that condition is looked upon at the present time as sufficient reason for removing the gall bladder

Dr Stanton of Schenectady N Y who has had a large number of his own gall stone cases and who has studied a large number of other cases as to the results is convinced that in these cases if drainage is made by means of a drainage tube a large proportion will have further trouble On the other hand if the gall bladder is tamponed with gauze which is left in place for five days or a week after the gall bladder has been sutured to the peritoneum and transversalis fascia these patients recover perfectly and permanently (Fig 144 3) In other words it seems as though the pressure of the gauze upon the lining of the gall bladder is what restores it to the normal condition and attaching the gall bladder to the peritoneum and transversalis fascia prevents the tissues from becoming strangulated again and prevents the accumulation of bile If there were no free flow of bile through this gall bladder that is if the cystic duct were obstructed and the mucous lining of this gall bladder was still in the same condition in which we find it today we would remove the gall bladder We would expect to find an accumulation of mucus in the gall bladder which could not be drained through the common duct into the duodenum and then there would be further trouble but where there is a free flow of bile and we can be sure of a perfect drainage of the gall bladder then the reason for the removal of a gall bladder disappears

We make use of a very important law in surgery—never to

Fig 144 —The gall bladder has been grasped with three hemostatic forceps and the trocar plunged into the fundus After draining the bile the trocar is removed and the opening enlarged 2 The forceps grasp the edge of the gall bladder Stones bile and mucus are removed by scoop ng and swabb ng 3 Method of suturing gall bladder to the peritoneum and trans ersalis fascia.
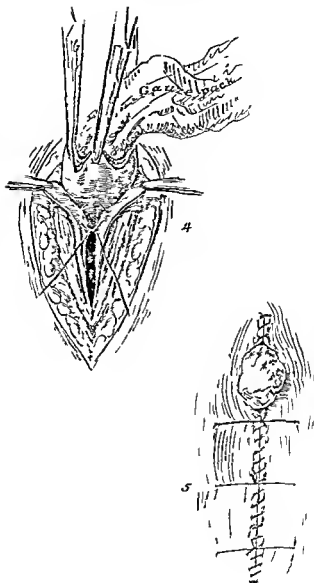
Fig 145

remove anything unnecessarily Having good drainage makes the removal of this gall bladder a useless step Now if we could be sure that cholecystectomy would be harmless then it might be perfectly proper for us to remove the gall bladder be cause it is perfectly proper from a surgical standpoint and from a pathologic standpoint to do useless things in surgery so long as one can be sure that these things are harmless That the re moval of the gall bladder is not always a harmless step we have found illustrated in dozens and dozens of cases that come to us for treatment and are very much worse after the removal of the gall bladder than they were before so that we have felt that their bad condition after operation is due to the removal of the gall bladder We may have been entirely right about that or the removal of the gall bladder may have had nothing to do with the postoperative condition but so long as these people are under the impression that the operation was performed for the purpose of curing them of their troubles and find that instead of being cured they are actually worse it is not a far cry to imagine that they were made worse by the operation Not a month passes but we encounter several cases in which the patient is very much worse after having had the gall bladder removed

Now there is a peculiar law that is generally applied to surgical work especially during the last twenty or thirty years which works out about like this An operation is performed for some peculiar condition and the general proposition is made this operation is going to cure these patients of all kinds of trouble For instance at one time removal of the ovaries at another time suspension of the uterus at another time removal of apparently healthy appendices at another time suspension of the kidney— and now removal of the gall bladder All these operations are at first hailed as being able to cure all conditions and then when it is found that they do not cure these conditions some other equally useless procedure is substituted At the present time the removal of the gall bladder holds that position and only those

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Fig 148 4 The tail gall bladder set to be applied 5 The wound closed with horsehair and allows out gut stitches The pack in the gall bladder is seen in the upper part of the wound just above the first ten on suture

who see an enormous number of cases and see the number of cases in which the patient is very much worse after the operation will appreciate the situation Within four or five years every body will be getting these cases and then the cry will go up against the removal of the gall bladder as a routine operation

We tampon the gall bladder lightly with gauze and then we suture it to the peritoneum and transversalis fascia (Fig 143 4 5) We permit this gauze to remain in the gall bladder for from five days to a week

After the operation is complete we wash out the stomach because the examination of the gall bladder has forced a lot of bile into the stomach You observe as the stomach tube is introduced into the stomach that a large quantity of bile is evacuated We will wash out the stomach with hot water (110° F) until the water returns perfectly clear without any bile stain Should we leave this bile in the stomach the patient would undoubtedly have nausea Washing out all this bile leaves the stomach perfectly clean and leaves the patient entirely free from nausea

CLINIC OF DR CARL BECK

NORTH CHICAGO HOSPITAL

A CASE OF MUSCULOSPIRAL PALSY TREATED BY NEUROPLASTY AND TENDON TRANSPLANTATION

Summary Case history—fracture of humerus with laceration of musculospiral nerve and resultant wrist drop two unsuccessful operations—failure to identify and unite the nerve ends neuroplasty with fat and fascial tube by Dr Beck transplant on of tendon of insertion of flexor carpi ulnaris into common extensor tendon results

THE case which I am going to demonstrate is of interest just now when the restoration of nerves after injuries is being studied in a large number of cases during the war

Almost innumerable are the instances reported in the war literature of suture of nerves after laceration by bullets bayonets and other destructive agencies Many good results are reported even after a considerable period has elapsed between the time of injury and the time of repair

The history of the case is as follows A young man age nineteen working in a factory fractured his right forearm by a fall It was a spiral fracture which lacerated the musculospiral nerve Immediate treatment consisted in approximation of the fragments by the factory physician A few days afterward however the physician noticed paralysis of the musculospiral nerve with typical wrist drop and decided upon open operation This was done The operation consisted in wiring of the fragments in good apposition and suture of the nerves As far as the physician was able to judge he had connected the lacerated ends No result as far as musculospiral nerve action was concerned ensued Two months later another surgeon opened the arm from an incision somewhat nearer to the median line and tried to find

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the severed ends of the nerves By that time the bones had
healed with very good callus This surgeon was sure he had
united the nerve ends but no results had appeared five months
later Another operation was suggested

At this time seven months after the injury with total
paralysis atrophy of the arm in the paralyzed muscles the boy
entered our service (Fig 146) I shall read you the description of
the operation which I performed at that time

Fig 146 —Wrist-drop in case of musculospiral palsy

Incision made on the outside of the forearm with excision
of the scar of the first operation The peripheral end of the
nerve is easily found It is adherent to a scar produced by the
suturing of the nerve to some structure which when dissected
proves to be either fascia or some branch nerve but not the
proximal end of the musculospiral A very minute dissection
upward discloses a bunch of whitish curled up tissue which
looks at first like a fat globule but later proves to be the proximal

end of the musculospiral curled up and folded on itself After it is unravelled it can be brought down so that its end which has never been sutured before lies in contact with the distal end when the arm is sharply flexed

Two sutures of very fine silk are now introduced in the perineural structures but not through the nerve This is thought very important inasmuch as sutures introduced through the nerve structure itself lead very easily to scar formation which prevents the formation of the axis cylinder offshoots in the healing together of such nerves The distance between the ends is about $\frac{1}{16}$ to $\frac{1}{8}$ inch

We now resect some fascia lata with fat and turn it into the form of a tubule over the sutured end of the nerve so as to form a conduit for nerve union The muscle is then approximated over the united nerve the arm is held in the highly flexed position and the external wound closed

It is expected that union of the nerve will take place and that the nerve will become physiologically active again but to assure the patient of some success and give him some usefulness of his arm even if such should not be the case I decide immediately to associate this neuroplasty with the transplantation of a muscle from the active group of flexors into the paralyzed extensors I use the flexor carpi ulnaris The incision is made from the os pisiforme alongside the tendon of the flexor The flexor is then cut off transversely below the pisiform bone A second incision is made on the dorsal surface of the forearm beginning below the transverse ligament of the wrist and the common extensor tendons are exposed raised with a forceps and a channel made toward the ulna underneath the skin the free end of the flexor grasped and drawn through the channel It is then sutured while the hand is held sharply extended to the extensor tendons and in this position the arm is kept in a plaster cast for three weeks (Fig 147)

Three weeks later the plaster cast was removed and first passive and then active motions were made with the arm It is now ascertained that the patient can move his hand with the aid of his transplanted flexor through an arc of about 15 degrees

and, when he closes his hand, through almost the normal range of motion The fingers cannot be raised, however, from a flexed position Thus the patient had been given some extensor motion, which, of course, was all due to the transplanted flexor muscle

Massage and faradic currents were now used daily on the arm, and active movements were attempted by the patient, and

Fig 147—After operation of neuroplasty and tendon transplantation—hand dressed in marked extension

within two weeks the fingers showed evidences of return of extensor power The musculospiral nerve showed beginning activity, and sensation had returned

The patient can now hold his hand even with the arm extended at a right angle, in line with his arm while formerly he had absolutely no such power even with the aid of the trans-

planted flexor muscle It is now twelve weeks since my opera-
tion and considerable improvement is noticeable (Fig 148)

From the literature and from former experience we know that
considerable time may elapse before active motion of the muscles
begins, but that in a large proportion of the cases the activity of
the muscles in response to stimuli transmitted through the
reconstructed nerve returns Neuroplasty through a tubule,

Fig 148   Result twelve weeks after operation   Compare with preoperative con
dition shown in Fig 146

therefore an old and well known procedure is a perfect success
It is important that the tube is such that contraction does not
take place In former times I used to wrap the nerve after
suture into the muscle substance itself I frequently used fat
alone but in the last few instances of neuroplastic operations I
have made especially good use of a flap of fascia and fat This
can be very easily obtained from the fascia lata with uniformly
good success

CLINIC OF DR ARTHUR DEAN BEVAN

PRESBYTERIAN HOSPITAL

SALIVARY CALCULI

Summary Signs and symptoms etiology and complications of salivary calculi
the diagnosis treatment repair of salivary fistulæ effect of prolonged x ray
treatment on glandular secreting activity

November 28 1917

I WANT to show you a very interesting case this morning in
which the diagnosis is somewhat difficult of explanation   This
patient is a man of about forty   He comes to us with a swelling
about as large as an egg under the angle of the jaw on the right
side in the position of the submaxillary gland   This swelling
has existed for about six months   It is very hard and not very
painful and has been diagnosed as carcinoma   There are however,
some other pieces of evidence that make me question this diag
nosis and make me hopeful that it is not a carcinoma   but a
chronic inflammation of the submaxillary gland associated with
stone formation in the ducts   These pieces of information are
three in number

First   The patient has noticed   on several occasions, small
grit like masses come out apparently from the submaxillary duct
into the mouth   Second   he has very distinctly noticed pus at
times pouring into the mouth from the opening of the submaxil
lary duct   Third   he has especially when the process was in its
early stages noticed rather definite increases and then diminu
tions in size occurring fairly rapidly in this mass

The man s general health is good and I have given him the
hopeful side of the case namely   that the lesion from which he
suffers is probably a chronic inflammatory process with calculi
and not a carcinoma

I shall do this operation under local anesthesia and shall use the new American product apothesin which we are using in just the same way that we formerly used novocain that is ½ of 1 per cent solution in sterile water heated to the boiling point and then cooled with 1 100 000 adrenalin After infiltrating the skin and superficial fascia I make a curved incision just under the ramus of the jaw so as to avoid injury to the facial nerve I divide through the skin superficial fascia and platysma and the deep cervical fascia covering the submaxillary gland The tissues
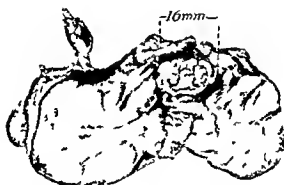
Fig. 149 Sketch of gross specimen showing large calculus entirely occluding submaxillary duct

are edematous and infiltrated and I must say suggestive of a malignant process I am raising up as you see a large flap exposing the submaxillary gland I now infiltrate the deeper part of the fat with apothesin and with very great difficulty I am isolating the gland from the surrounding tissues At the upper part of the dissection there are several enlarged lymphatics which are also suspicious of carcinoma and the gland is embedded in edematous connective tissue making the dissection extremely difficult and it makes one think of a mass of tissue that has been embedded in paraffin or plaster of Paris It is necessary to

ligate the facial artery and facial vein in the dissection and I
have exposed the hypoglossal nerve in the bottom of the wound
I am now completing the dissection and find that the mass of
tissue extends from the main gland up into the floor of the mouth
The mylohyoid and hyoglossus muscles around it are infiltrated
and edematous and I finally succeed in removing the entire
gland in one piece

Fig 1 0 Drawing from 16mm object e from a one rie m n shown in
Fig 14) No t round cell infiltration on an diffuse of gland and al ence of e idences
of ar n ma

I sh ll ut thi pecimen open and as I cut it the knife grates
like it d m dividing carcinoma of the breast   As I extend
the sectin I u ver ou see I expo e to view in that portion of
the glan l hich projecte toward the m uth a large yellowish
salivar t ne th ize of the end of my index finger which is in
the m un uln xillar duct (Fig 149) and a number of small
cal uli pr je tin into the l ranches that g to f rm the main duct

There are two possibilities in this case from this examination of the gross specimen one that we have an inflammatory process pure and simple with salivary calculi and another that this may be a case of carcinoma of the submaxillary gland associated with stone formation I have seen a parallel condition in the kidney namely carcinoma of the kidney with kidney stone

The operation has been tedious and prolonged and yet the patient has stood the ordeal very well—I think on the whole better under local than if it had been done under general anesthesia—although if I had known the difficulties of the dissection beforehand I think I should have preferred a general anesthetic.

Postscript—The microscopic examination of the specimen showed chronic inflammation of the submaxillary gland with round-celled infiltration (Fig 130) careful examination of sections taken from several parts of the gland failed to show any evidence of carcinoma

I should like to use this case as a text and say a few words about salivary calculi and the operations that we have recently done on the salivary ducts Salivary calculi are comparatively rare but at the same time in a large hospital experience they occur not infrequently We have had on our service probably 20 or more of these cases The condition is so infrequent however that it is not as a rule recognized by the general practitioner The pathology of this condition is the same as that of gall stones or kidney stones the formation of the calculi being the result of stone-bearing catarrh of the mucosa of the salivary ducts this stone-bearing catarrh leading to the formation of nuclei or masses of mucus pus or blood and around these nuclei the salts from the saliva are deposited In addition I am quite sure that foreign bodies not infrequently act as nuclei of these salivary stones Small pieces of oyster shells or food particles that are forced into the open mouthed duct during the process of mastication may become the nuclei of salivary stones I have seen a number of these cases where the stones were accidentally discovered and where they gave rise to no symptoms whatever One of my medical colleagues has known for years that he has a salivary stone in one of his submaxillary ducts He can feel

it very distinctly It has never given rise to any trouble, and be
has not thought it necessary to have it removed by operation
The common picture, however, of salivary stone is that of ob-
struction of the duct with sudden swelling of the duct, especially
during meals, and sometimes definitely occurring after eating
some slightly acid substance, like a pickle, which stimulates the
rapid flow of saliva Sometimes these obstructions are exceed
ingly painful As a rule, they are transitory, the saliva gradually
working past the obstructing stone into the mouth relieving the
tension with subsidence of the swelling Sometimes, however,
the swelling is more persistent and is associated not only with
obstruction of the salivary duct, but with evidences of infection
of the submaxillary ducts, such as the evacuation of pus from the
duct or the development of a tender, painful swelling due to
extension of the infection to the gland tissue itself, and in some
cases with definite abscess formation in the glands, leading to the
necessity of drainage either through the mouth or under the jaw
This symptom complex, if once seen, is, as a rule, readily recog-
nized in the next case encountered

The diagnosis is, as a rule confirmed in the simple type of case
by feeling the presence of stone in the duct Not infrequently
the patient has discovered this fact, and will call the attention of
the surgeon to the presence of a hard body in the floor of the
mouth, which on examination proves to be a salivary stone
When a stone is located in the submaxillary duct without asso
ciated infection, the treatment is very simple and comparatively
easy It consists in the removal of the stone through an incision
in the duct The operation should be done under local anesthesia,
either with a solution of novocain or apothesin to which has been
added a fair amount of adrenalin, the adrenalin is useful in that
it tends to cause the blood vessels to contract and thus makes
the mucous membrane temporarily relatively avascular A
direct incision is made over the stone through the mucous mem-
brane of the mouth and wall of the duct and the stone removed
In such a case as the one that we have just operated upon the
mere removal of the stone would probably not cure the patient
There has been such a long standing inflammation of the duct

Fig. 151

that recurrence of the stone would be probable and the continued suppuration from the duct would probably continue even though the stone were successfully removed. In this respect these cases are very similar to those cases of kidney stones in which there are movable stones filling the pelvis and calices with associated extensive destructive processes in the secreting structure of the kidney tissue, in such cases from long experience we have learned that removal of the entire kidney with the stones is preferable to simply removing the stones themselves because there is such a great probability of failure to cure if the injured kidney is allowed to remain even though the stones are completely removed.

In most of our cases of salivary stones the calculi have been in the submaxillary duct. We have, however, had a few cases in which the stones were located in the parotid ducts, in one such case which came to our service two months ago there was an abscess of the parotid gland just ready to break on the face. There had been considerable pain associated with an inflammatory swelling of the parotid gland following a rather typical history of long standing obstruction of the salivary gland from stone occurring intermittently. In this case I cut down directly into the abscess through the tissues of the cheek from without opened the abscess, removed the stone, and then took a small catheter about No 8 and introduced it into the dilated pocket of the duct from which we had removed the stone, and then carried it through an opening which I made in the mucous membrane of the mouth with a pair of closed artery forceps, stitched it in this position and cut off the tube inside of the mouth so as to leave projecting into the mouth simply a short part of the tube about $\frac{1}{16}$ inch. I then closed the external incision with fine silk sutures. Fortunately we succeeded in obtaining an admirable result in this case and I shall draw on the board these diagrams illustrating the steps of the operation (Fig 151).

Fig 151 —Case of abscess secondary to obstruction of parotid duct by calculus steps in the operation for the removal of the calculus and repair or reconstruction of the duct

The other case involving the parotid duct which we have recently had under observation was extremely interesting It was in a patient a man of about fifty who had had a slowly developing rodent ulcer of his cheek for six or eight years The disease eventually ate into the parotid duct and produced a salivary fistula He was then treated by some very good x ray man for the rodent ulcer He was referred to me by the x ray expert who believed at that time that the malignant process had been entirely obliterated and I was requested to restore the submaxillary duct

Under local anesthesia I dissected down to the duct introduced a small rubber tube into the proximal end of the duct and made another opening with a closed pair of artery forceps into the mouth and carried the tube into the mouth I then dissected the old fistulous tract on the skin and closed the skin incision completely with suture Unfortunately the wound did not get well. Examination of the fistulous tract which I removed showed that the rodent ulcer—a basal-celled epithelioma as proved by microscopic examination of section—had not been cured but still persisted. However part of our operation was successful in turning the flow of saliva into the mouth and relieving the salivary fistula Later however there was recurrence of the rodent ulcer It was handled for a long period of time with x ray

to eat without losing a good deal of food through this opening The patient persisted in using the x ray for a long period but finally he returned to me I advised an extensive plastic, taking out the epithelioma widely and dividing part of the masseter muscles which were so contracted by the disease process as to produce almost complete closure of the jaws and then close the defect with a large flap taken from the skin and superficial fascia of the neck This was done within the last few months and I have seen the patient recently There is no evidence of recurrence and the plastic has given a really ideal result

An interesting condition developed in this case Owing I believe entirely to the long continued use of the x ray the parotid gland has been destroyed as a secreting organ because although the destructive process must have destroyed the parotid duct which I had repaired there has been no return of the salivary fistula since the last operation This is in keeping with what we might expect from long continued use of the x ray in cases of this kind

CARCINOMA OF STOMACH—PYLORECTOMY

Summary Historical sketch—the work of Péan and of Billroth cure of gastric can cer—early diagnosis indispensable the three objects of operation explorat on palliation cure diagnostic data in present case preoperative care techn c of pylorectomy after management

December 5 1917

I DESIRE to discuss with you this morning the subject of carcinoma of the stomach and to operate upon a case in which the clinical diagnosis of carcinoma at the pylorus has been made and where the evidence obtained suggests conditions which will probably make it possible for us to do a radical resection

The history of surgical operations for carcinoma of the stomach begins with the first case operated on in 1879 by Péan of Pari Péan conceived a proper technic of procedure but unfortunately his patient died The first successful case was operated on by Billroth in 1880 It is very interesting in reviewing Billroth s work and the work of the surgeon of today to see how fully Bill roth understood the surgical problem involved and to find that he at once developed a surgical technic with such perfect mastery of details that it has practically not been changed from that time until today I was fortunate in having an opportunity of study ing in Billroth s clinic for a few months in 1892 93 and to hear the great master of stomach surgery discuss this subject and pre sent several cases which he had operated upon some years before Several of these showed no evidence of recurrence One was an unusual case which showed a late recurrence eight or ten years after operation Billroth devised two different methods of resecting the stomach at the pylorus One known as Billroth No I in which after resection of the pylorus he united the cut end of the stomach to the duodenum and the other known as Billroth No II in which he closed the end of the stomach and duodenum and made a gastro-enterostomy The Billroth No II operation was thought to be indicated where a wider removal of tissue was required This operation the Billroth No II is the

operation which may today be regarded as the standard procedure   Billroth, in his stomach resections, used three rows of sutures, one through the mucosa, the second through the muscularis and peritoneum, and the third, a Lembert suture   Many attempts have been made to improve this simple and efficient method, and yet I believe the suture method introduced by Billroth remains today the best method that has been introduced, and we have for years employed it in our clinic.

Carcinoma of the stomach is one of the commonest forms of carcinoma that the medical man and surgeon have to deal with The lesion, as a rule, is first seen by the general practitioner or by the internist, as the early symptoms are frequently vague, and neither the patient nor his physician are apt to consider surgical consultation desirable   Carcinoma of the stomach however, is just as truly a surgical condition as is carcinoma of the breast, because the only hope of relief the patient has is afforded by surgical procedures   Unfortunately, many of these cases are carried along for weeks and months without being recognized, and when the surgeon is consulted the process has gone so far that radical operation is out of the question   In our experience the favorable cases are those in which the carcinoma is situated at the pylorus and produces early and definite symptoms of obstruction   Where the carcinoma is situated in the body of the stomach it, as a rule, does not give definite evidence of its presence until it has grown to such a size and produced such extensive local and even general involvement that no radical removal can be made

Carcinoma of the stomach could be cured with just as much certainty as carcinoma of the breast or epithelioma of the lower lip if we could discover it as early as we are often able to do in the breast and lip cases   The one great problem that confronts the physician and surgeon today in carcinoma of the stomach is the problem of diagnosis, and especially the problem of early diagnosis, diagnosis at *a time when radical removal of the lesion* is still feasible   The *x* ray has thrown a good deal of light on this subject within the last few years, and has often given us definite evidence of the existence of carcinoma by the demonstration of

filling defects which, with the other evidence obtained, has made it possible to arrive at a clinical diagnosis of early carcinoma with a fair degree of probability A definite and absolute demonstration that the stomach lesion is carcinomatous cannot be made in many cases except by actual operation and microscopic examination We find, as we analyze the cases as they come to the clinic, that the surgeon at the time of operation can do one of three things first, radical resection of the lesion, second, the palliative operation of gastro enterostomy, especially indicated where radical resection is out of the question and there is an early obstruction at the pylorus or conditions present which will later develop into obstruction at that point, third, exploration only This procedure is indicated in a group of cases where the lesion is found so extensive that radical operation cannot be made and where there is no fair indication for the palliative operation of gastro enterostomy

Our diagnostic ability and our surgical technic for handling these stom

dicated and carried out the associated mortality is reasonably small, from 10 to 20 per cent, varying in different series of cases Probably 25 per cent of these cases are still without evidence of recurrence at the end of three years, 50 per cent or more are greatly relieved by the radical operation for periods varying from one to three years or more, and then die of recurrence or of some intercurrent disease In other words, one can say with assurance that 75 per cent of the cases in which resection can be made are either cured or very greatly benefited by surgical therapy This is in striking contrast to the history of cases of this type if they are not given the benefit of surgical operation Nothing is more distressing than death from carcinoma of the stomach The distress from the pyloric obstruction, the pain, the starvation the loss of weight and strength, gradually creeping along through weeks or months of misery, all go to make a very distressing picture In cases in which at the time of operation radical removal is found impossible and there is obstruction at

A colca med

Fig. 152
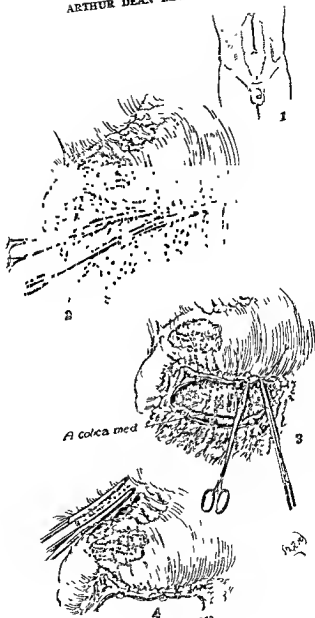
the pylorus gastro enterostomy should be done   In many cases this gives very great relief for a considerable period   As a rule, however, this palliation does not extend over a period exceeding six to twelve months and is then followed by wide spread regional involvement general carcinomatosis and sometimes with recurrence of the obstructive symptoms   The palliation obtained by gastro enterostomy in these cases is not nearly as great or prolonged as that obtained by radical operation

This patient is a man of sixty, who has been under the care of Dr Sippy for several weeks   A clinical diagnosis of carcinoma at the pylorus has been made   The evidence is that of stomach distress pyloric obstruction absence of free hydrochloric acid presence of Opper Boas bacilli and loss of weight and strength Screening of the stomach shows a distinct filling defect at the pylorus   The hemoglobin has been reduced to about 45 per cent

I shall do this operation under drop ether, which is given by Dr Herb   The patient has been prepared by having his stomach washed out about an hour ago and for the last forty eight hours he has been given plenty of liquids   I now make a midline incision between the ensiform and the umbilicus   I want to call your attention to the fact that I make the incision a little to the left of the ensiform cartilage and then come down in the midline and then a little to the left of the umbilicus so that if necessary to enlarge the incision I can do so readily without interfering with the round ligament of the liver (Fig 152 1)   Exposing the peritoneal cavity   I come down to the rather large but normal lobe of the liver in front of the stomach extending down halfway between the ensiform and the umbilicus   Lifting the stomach into view   I find a tumor at the pylorus from 1½ to 2 inches wide This involves the lesser curvature close to the pylorus   The duodenum as is usual is free from carcinoma although the car

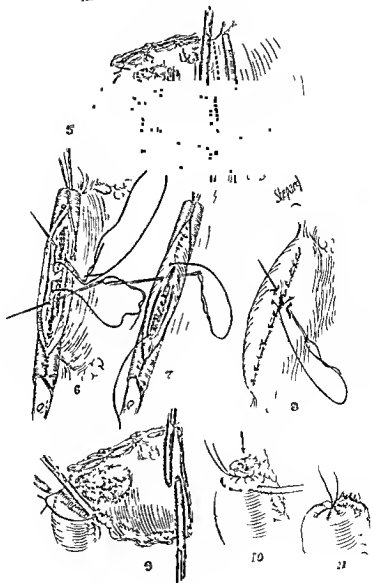Fig 152—1 Midline incision from ensiform...

cinoma comes up to the **pylorus** itself   There are a few small
glands at the lesser curvature which are somewhat enlarged and
hard and probably carcinomatous, but the whole mass is quite
freely movable and is not bound down to the pancreas, and I
think conditions favorable not only for resection but for ultimate
cure
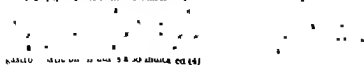
The first step of the operation is the separation of the omentum
extending between the stomach and transverse colon   As I do
this I ligate the vessels at two points and divide between   I
ligate with catgut   It requires, as you see, seven or eight ligatures
on the stomach side and on the colon side to make a wide separa
tion of the transverse colon from the greater curvature of the
stomach and duodenum   This exposes freely the lesser pentoneal
cavity (Fig 152, 2, 3)   In doing this step of the operation I find
here a large artery (the colica media) which runs from the
superior mesenteric artery to the colon in close contact with the
field of operation, and *if I had not known of its existence and taken
steps to avoid it* I would have ligated this main blood supply of
the transverse colon and probably killed the patient because of the
gangrene of a large part of the transverse colon, which would have
resulted   This is a point in the operation which should be
especially borne in mind   Now in the same way I ligate the
gastrohepatic omentum for a distance of 4 or 5 inches, freeing
completely the lesser curvature of the stomach and the upper
border of the duodenum (Fig 152, 4)   I have now mobilized very
fully and completely this tumor mass so that I can bring it well
out of the wound   I pack a large abdominal pad in the lesser
pentoneal cavity beneath the stomach and duodenum   I
now apply a large stomach clamp protected with rubber tubing to
the stomach at about the junction of the lower and middle
thirds of the viscus   An inch to the right of this I now apply a
massive crushing clamp and cut through the stomach between
these clamps, protecting the mucous membranes exposed by
gauze pads   Then, as you see, *I close the end of the stomach by*
three rows of sutures, one through the mucosa, one through the
pentoneum and muscularis, and the third a definite Lembert
suture   You will notice that I have ligated the large arteries

close to the stomach at the lesser curvature and at the greater curvature I have ligated these with fine catgut (Fig 153, 5-8) The stomach is now completely closed I now separate the duodenum down to the pancreas and completely mobilize it for a distance of about 2 inches from the pylorus I take this large crushing clamp and crush the duodenum just behind the pylorus I remove the clamps and ligate the duodenum here with a silk ligature (Fig 153 9) I then cut off the duodenum about ½ inch to the stomach side of the ligature and remove this entire mass I shall ask Dr Sippy to cut open the specimen and demonstrate the gross appearance

As you see there is a large carcinomatous ulcer in the interior of the stomach with carcinomatous infiltration of all layers of the gastric wall On the stomach side you see that I am quite wide of the carcinoma at least 2 inches On the duodenal side I am in quite close contact with the carcinoma which extends up to the pylorus The handling of the stump of the duodenum has been to me one of the most difficult and complicating problems in these operations Frequently it is difficult to mobilize so as to make it possible to secure a good closure In this case I put in a purse string suture about 1 inch from the point of the ligature and invaginate the stump of the duodenum (Fig 153 10 11) You see I have a little difficulty in placing the stump inside of my purse string I now have a very complete closure of the duodenal end Another method which I have employed is suturing up the end of the duodenum by two or three rows of sutures I am really uncertain in my own mind as to which is the best method of procedure I do know however that complete closure of this duodenal stump without leakage is one of the most important parts of the operation and of late years we have never failed to carry a small cigarette drain through the external wound down to this point of closure leaving it in twenty four or forty-eight hours to provide against leakage

The remaining step of the operation is a gastrojejunostomy with rapid suture It is really immaterial whether you do an anterior gastro enterostomy or a posterior I have not been able to see much difference in the end results and in this case

cinoma comes up to the pylorus itself   There are a few small
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Fig 153

I shall do an anterior gastro enterostomy, which we can do with a very short loop of the jejunum rapidly because we have so fully mobilized the stomach by resection The gastro-enterostomy we do with three rows of sutures making an opening about 1¾ inches in length between the stomach and jejunum The external wound is now closed and I am doing here what I believe is wise in addition to the ordinary suturing I am putting in two large mattress sutures of silkworm gut as tension sutures, tying them over a small piece of cigarette drain about 1 inch in length and very much as years ago surgeons employed the quilted suture The reason for doing this in these cases is that because of the low vitality of these patients—this patient having but 45 per cent hemoglobin and being very much undernourished—wound repair is much slower and less complete than in patients who are in good general condition One cannot safely remove the stitches early, because if you remove the stitches at the end of eight or ten days not infrequently the wound opens up because wound repair is not yet sufficiently complete to withstand the intra abdominal strain On that account I remove the skin sutures and particularly the silkworm gut sutures at the end of ten days, but leave the two mattress tension sutures in for a longer period—twelve days and sometimes as long as fifteen days—until I am satisfied that wound repair is complete

Another point is this I like to get these patients sitting up early, and I feel more comfortable in doing this with a couple of mattress tension sutures protecting the incision than I would if the incision was closed in the ordinary way

The after management in these cases in our service is quite simple For the first twenty four hours we give the patient

Fig 153—The artery gastro-ep ploica dextra (5) is divided between the for ceps and ligated and then the large gastric clamp applied between the divided ends. This step contributes materially to the ease and safety of the operation 6 7,8 S te for division of stomach under control of forceps. Closure of cardiac end after division by the Billroth three-layer method 9 10 11 The gastroduodenal junction is grasped by means of two crushing clamps the lower clamp is then re moved and a s k I gature appl ed snugly in its stead The tissues are then divided between the ligature and the remaining clamp after which the duodenal stump is invaginated by purse-string sutures.

10 to 12 ounces of normal salt solution by rectum every three or four hours and nothing by mouth   After the first twenty four hours, however, we begin giving the patient 1 ounce of water each hour by mouth and if this is retained without distress we then begin with milk and water, milk and cream and broth, and within three or four days are giving the patient thin gruels and gradually increase the diet so that at the end of a week the patient is on a soft tray, and at the end of ten or fifteen days on a full tray   The patients are allowed, if they are able to do so, to sit up on back rest within forty-eight or seventy two hours, and to sit up in a chair in five six or seven days   There seems to be less likelihood of the development of hypostatic pneumonia and of lung complications where we are able to get these patients up early

Postscript —The microscopic examination of the gross speci men showed carcinoma and also carcinoma of the lymphatic glands at the greater curvature   The patient made a good operative recovery, and the case is one in which there is a very fair prospect of cure   We have had a number of these cases live without recurrence for three, five and eight years after operation and one cannot help but be tremendously impressed by such recoveries, knowing what would have resulted inevitably in these cases had not the carcinoma been radically removed

CLINIC OF DR JOSEPH BRENNEMANN

St Luke s Hospital

(Given for the Surgical Congress October 24 1917)

CASE OF RAT BITE FEVER

Summa y A patient presenting a peculiar train of symptoms following a b te by a weasel diagnos s of rat b te fever etiology—a sp rochete or a streptothrix sal varsan supposedly curative

October 24 1917

THIS child presents an unusual and rather rare condition This boy has a sepsis of a peculiar type Two days ago he had a temperature of 106° F and was very very sick Four days from now he will again have a high temperature and he very sick I feel quite positive in being able to say so He is at present perfectly well and has had a normal temperature—perhaps a little subnormal—for forty eight hours What sort of a condition could produce that type of sepsis? On the 19th of August this boy was playing in one of the parks with three or four other boys when they discovered a weasel They went after it with sticks and finally cornered it but the weasel bit this boy on both hands where you see this dark discoloration The wounds were treated immediately by a druggist before taking him to a doctor who thoroughly cauterized them The boy did not feel very well for the next week or two At the end of two weeks both the places that had been bitten began to swell up The hand on the right side swelled up to fully twice the normal size and the hand on the left side also swelled up He had very little pain no redness The hands were simply very much swollen with a rather dark red discoloration He had a temperature of 104 5° F and was quite sick The epitrochlear glands on both sides were distinctly enlarged and the cervical glands were d stinctly enlarged He

10 to 12 ounces of normal salt solution by rectum every three or four hours and nothing by mouth. After the first twenty four hours, however, we begin giving the patient 1 ounce of water each hour by mouth, and if this is retained without distress, we then begin with milk and water, milk and cream and broth, and within three or four days are giving the patient thin gruels, and gradually increase the diet so that at the end of a week the patient is on a soft tray, and at the end of ten or fifteen days on a full tray. The patients are allowed, if they are able to do so, to sit up on back rest within forty-eight or seventy two hours, and to sit up in a chair in five, six or seven days. There seems to be less likelihood of the development of hypostatic pneumonia and of lung complications where we are able to get these patients up early

Postscript.—The microscopic examination of the gross speci men showed carcinoma and also carcinoma of the lymphatic glands at the greater curvature. The patient made a good operative recovery, and the case is one in which there is a very fair prospect of cure. We have had a number of these cases live without recurrence for three, five, and eight years after operation, and one cannot help but be tremendously impressed by such recoveries, knowing what would have resulted inevitably in these cases had not the carcinoma been radically removed

to it The Japanese have done the most of the work There
have been more cases in Japan than anywhere else They have
isolated a spirochete and the disease has been transmitted to
guinea pigs It is quite common for a rat that will transmit the
disease to one person also to transmit it to another The
organism has been found in the salivary glands The spirochete
is the organism which is probably more commonly accepted as
being the etiologic factor On the other hand, Schottmüller, in
Germany, and Blake, in this country, have each had cases in
which they found a streptothrix which could he distinctly demon
strated in people, while the spirochete could not he demonstrated
This streptothrix is not transmitted to guinea pigs Of course the
organism that causes rat bite fever in Japan may not cause it
here There have been only 80 cases reported in the literature
In this case we have found nothing The laboratory is working
on it, but no definite results have been obtained

The other boys did not get the infection The interesting
thing about these cases is that in many of them one gets a positive
Wassermann reaction I think in this case, since there is a
history of five miscarriages, there is a probability of a leutic
basis, and this may account for the positive Wassermann here
There is no other reason to think the boy himself has it The
mother likewise gives a positive reaction Salvarsan is supposed
to he markedly curative In this case it is doubly indicated and
will be given

had a peculiar mottled rash on his body Two days later he was all right At the end of four or five days he had a high temperature again. I saw him at the dispensary, and after the second attack brought him into the hospital to have him under careful observation during the time he went through this course He will have two days of high temperature, usually $105°$ F, within twelve hours it is down to normal, remains practically normal for four days and then goes up again. This time it came down rather slowly That condition will probably keep on

There are two things that will cause such a condition, one is relapsing fever and the other is rat-bite fever The clinical course of rat bite fever is exactly the same as this The symptoms appear sometimes in a month, but usually at the end of two weeks There is usually not much pain and not much redness locally The glands that drain the region bitten are involved and the patient has a high temperature They quite commonly with some attacks have a distinct erythematous eruption This child with two attacks has had quite a marked eruption over the face and sometimes over the other parts of the body, which looks very much like ringworm, but is very transient The typical thing in the course is that there is never any suppuration and that you have a distinctly relapsing fever as distinct as with relapsing fever itself There is so distinct a periodicity that you can definitely say that on such and such day he will have the fever One case is reported in which there were twenty-six such relapsing attacks These attacks may go on for years The usual interval between them is from four to five days In a good many of these cases they apparently have relapses once or twice a year There is a case on record in which fifteen years after the original infection the patient every year had had one of these febrile attacks

The prognosis is good about 10 per cent mortality The greatest mortality is in the first attack The rest of the course probably depends to some extent upon the treatment though the mortality is probably not over 10 per cent We ordinarily expect these cases to get well in a short time

The interesting work that has been done has been chiefly in regard to the etiology There are two different ideas in regard

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embryology The descriptions of the embryos to be studied in the laboratory are
concise yet they are profusely illustrated the majority of the pictures being original*

*It is the only comparatively brief text in which a large number of original
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Dr Frederick P Gay, University of California

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This work will also appeal to academic and scientific students. It contains
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